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## DIESEL RAILWAY TRACTION SUPPLEMENT

The June issue of THE RAILWAY GAZETTE Supplement, illustrating and describing developments in Diesel Railway Traction, is now ready, price 1s.

## GOODS FOR EXPORT

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as indicating that they are available for export

## NOTICE TO SUBSCRIBERS

Consequent on paper rationing, new subscribers in Great Britain cannot be accepted until further notice. Any applications will be put on a waiting list, and will be dealt with in rotation in replacement of subscribers who do not renew their subscriptions. Orders for overseas destinations can now be accepted

## POSTING "THE RAILWAY GAZETTE" OVERSEAS

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. THE RAILWAY GAZETTE possesses the necessary permit and facilities for such dispatch.

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas

## TO CALLERS AND TELEPHONERS

Until further notice our office hours are: Mondays to Fridays 9.30 a.m. till 5.30 p.m.

The office is closed on Saturdays

## ANSWERS TO ENQUIRIES

By reason of staff shortage due to enlistment, we regret that it is no longer possible for us to answer enquiries involving research, or to supply dates when articles appeared in back numbers, either by telephone or by letter

## ERRORS, PAPER, AND PRINTING

Owing to shortage of staff and altered printing arrangements due to the war, and less time available for proof reading, we ask our readers' indulgence for typographical and other errors they may observe from time to time, also for poorer paper and printing compared with pre-war standards

## Mr. Churchill's New Government

M R. CHURCHILL'S re-organisation of Government offices pending the General Election in July, makes no change in the Minister of War Transport. Lord Leathers, who already enjoys a record in the tenure of that office, continues in it. Captain G. E. P. Thorneycroft succeeds Mr. P. J. Noel-Baker as Parliamentary Secretary. Mr. Noel-Baker has held that office since February, 1942, less than a year after Lord Leathers had become the first Minister of War Transport in May, 1941. Because his Minister sits in the Lords, the Parliamentary Secretary has been brought into greater prominence than otherwise would have been the case, for he has had to handle all matters in the House of Commons relating to the department. Although, as is well-known, replies to parliamentary questions of which notice is received are prepared by the permanent staff of the Ministries, the supplementary question has a reputation for testing the departmental spokesman. It has been rumoured that, in the event of a Labour Government being returned, Mr. Noel-Baker might be the next Minister of Transport, although it is also suggested that his own ambitions might lie in other directions.

## \* \* \* \* \*

## Transport Organisation in the Future

Major Malcolm S. Speir, L.M.S.R. Chief Officer for Scotland, addressed the Scottish Section of the Institute of Transport recently on post-war organisation of transport. He urged that it was necessary for transport people to understand that what was required was so to arrange the transport system as to give door-to-door services for passengers and goods. It would be necessary to utilise the best forms of all transport; including coastwise shipping, to give the particular services required. In approaching transport problems in the future, there would have to be a much closer contact between operators and customers. Public traders would have to be made to realise that the motto of transport was "Service," and to do this it would be necessary to study the different needs of the various types of industry, and for industry and transport to work closely together. The war had demonstrated clearly that to carry mass freight and large numbers of passengers, the railways were the backbone of the land transport industry. One train, on an average main line, could carry as many passengers or as much merchandise as ten double-deck buses or ten large lorries and trailers. As these would have to be operated by equivalent manpower units, it was necessary, for the common good, to utilise the railways to the greatest possible extent.

## \* \* \* \* \*

## Inland Transport Rates Policy

Starting from the basis that Government policy should be to encourage traffic to flow by that form of transport which is cheapest for the community, having regard to the service, Brigadier-General Sir H. Osborne Mance, in an article contributed to our contemporary, *Modern Transport*, says that it is impossible for "value" and "cost" rate structures to exist side by side. Sir Osborne Mance suggests that the track costs of the different forms of transport should be pooled and a toll levied for the use of the track. The different forms of transport, including "C" licence vehicles, could then compete on the basis of their operating costs. The organisation controlling the track pool would be a monopoly, which would enable tolls to be fixed to give effect to Government rate policy. If this included the provision of cheap rates for coal and other low-grade traffic, it could be made effective by levying lower rates of toll for these traffics. The authority controlling the pool would decide on what track facilities should be extended, improved, or abandoned, in accordance with the general trend of transport development. If these plans were adopted, Sir Osborne Mance states that the railways would be able to enjoy competitive equality in track costs such as they had never conceived before.

## \* \* \* \* \*

## Imperial Chemical Industries

Lord McGowan had an impressive story of achievement over a wide range of essential contributions to the war effort to recount to his shareholders at the annual meeting of Imperial Chemical Industries Limited. His speech, however, was by no means confined to listing the achievements of his company, great as they have been. He was confident that both in the transition period and in whatever order may emerge afterwards, his company was well placed to maintain its high position. During the war I.C.I. plants have been greatly extended, but the majority of the works have played their part by continuing their normal peacetime production. The operation of the plants will depend on ability to obtain the necessary raw materials, most of which are indigenous to Great Britain; Lord McGowan voiced the concern of many industrialists at the present uncertainties in coal supply and prices. He emphasised that the wartime achievements of I.C.I. have been the result of a system of free enterprise. He rejected

any suggestion that free enterprise has had its day, but he believed that it was on trial. America was committed to a system of free enterprise, and if Great Britain departed from it, it would soon feel the results of competition with the U.S.A. in the markets of the world.

#### Post-War Policy for Canals

The Canal Joint Committee comprising representatives of the Canal Association and of the National Association of Inland Waterway Carriers has presented to the Ministry of War Transport a reasoned statement on post-war policy for inland waterways. Artificial canals, as distinct from estuarial waterways and navigable rivers due to war conditions, have in their maintenance fallen below the standard for efficient working. Further bank protection is necessary to enable power-driven craft to operate satisfactorily, and the modernisation of terminal facilities and plant is needed to ensure speedy turn-round of craft and the efficient operation of collection and delivery services. The carrying section of the canal industry comprises three statutory carrying companies and several hundred units of varying size. Standard conditions of carriage should be formulated, and consideration be given to voluntary amalgamations, or the establishment of working arrangements for controlling the policy of carriers with like activities in the same area. Traders should be at liberty to choose means of transport and the committee is opposed to any scheme which would compel traders to consign and operators to carry specified classes or grades of merchandise. The carriers regard a correlated rates structure for all forms of inland transport as essential, but draw attention to the difficulty of maintaining any rates structure if traders had the right to use their own vehicles in all circumstances. Public carriers also should be restricted in undercutting scheduled rates. A scheme of guaranteed maintenance should be established for the independent waterways until the whole post-war transport policy materialises.

#### Flexible Under-Sea Pipelines

Within recent months, as security restrictions have been lifted, we have published various brief details about the enormous developments during the war in the use of pipelines, which have become one of the "seven forms of transport." On May 24, a statement from the Prime Minister revealed the existence of an oil pipeline system under the sea across the English Channel to the Continent, and supplying with petrol a large part of the Allied Expeditionary Force. The enterprise bore the name "Operation Pluto" (Pipe Line Under The Ocean) and was wholly a British achievement. It was conceived early in April, 1942, when the Chief of Combined Operations (Lord Louis Mountbatten) asked the Minister in charge of the Petroleum Warfare Department (a secret department established in 1940) whether a pipeline across the Channel was possible to supply the requirements of his flame throwers. Two forms of flexible 3-in. pipe were devised to take working pressures in excess of 1,200 lb. a sq. in.; one was a cable generally similar to a submarine electric power cable without the cores and insulation, and the other a welded steel pipe which could be wound on a 30-ft. drum. Successful trials were completed by April, 1943, and the work was then developed in conjunction with the Admiralty Department of Miscellaneous Weapons Development. A few weeks after D-Day, several lines were established from the Isle of Wight to Cherbourg. Subsequently, to avoid long lines of communication, 500 miles of pipe were laid between Dungeness and Boulogne and extended to Antwerp, Eindhoven, and Emmerich. A million gallons a day were soon being pumped from the Mersey to the Rhine. The whole enterprise was a fine feat of amphibious engineering skill, but it was devised as a temporary expedient and it is too early to assess its commercial possibilities.

#### L.N.E.R. Five-Year Locomotive Plan

During the next five years 1,000 L.N.E.R. locomotives will be withdrawn and replaced by a like number of engines of modern design. The company's workshops will construct 500 at the rate of 100 a year and the remainder will be supplied by British locomotive building firms. Wartime traffic handled by the L.N.E.R. called for the retention during the past 5½ years of every locomotive capable of hauling a train, and wholesale modernisation of the L.N.E.R. stock of 6,400 steam locomotives is now overdue. The 1,000 locomotives to be withdrawn will consist of 389 passenger tender, 126 passenger tank, 338 freight tender, and 147 freight tank engines. Their disappearance will mean the complete elimination of 49 different classes of steam locomotives owned by the L.N.E.R. and reduce considerably the number of different spare parts that must be kept in stock or specially manufactured. The 1,000 new locomotives will be of ten designs, seven of which are already in use, and all the principal parts, such as boilers, cylinders, bogies, and pony trucks are interchangeable between two or more designs. The most numerous type to be built will be the

class "B1" 4-6-0 mixed traffic engines which first appeared in 1942, and of which 400 are to be constructed. The first locomotive to be completed under this five-year plan is nearly finished. It is a 2-6-4 tank engine of a new type to be known as class "L1," of which 110 are to be built, and is designed for heavy mixed-traffic duties.

#### L.M.S.R. Coach-Building Programme

The London Midland & Scottish Railway has announced that 800 new corridor vestibule coaches are to be built as the first instalment of an extensive scheme to provide more and better facilities for passenger travel. The coaches will provide 33,000 seats and they are the first to be built by the company for over five years. The first of these vehicles was completed within five days of VE Day, and the remainder are coming off the assembly lines at the L.M.S.R. carriage-building shops at Wolverton and Derby, which only a few weeks ago were engaged on the manufacture of assault craft and other war weapons. The coaches now in production include improvements such as better steam heating and hot water supply. No provision is made in the carriage decorations for pictures or advertisements. The finished work is made from Nigerian cherry mahogany.

#### Dining Cars and Typhoid

During an unprecedented outbreak of typhoid in Eire two ladies complained of having contracted the disease from food supplied to them on June 24, 1944, in a dining car of the Great Northern Railway (Ireland) between Dundalk and Dublin. Actions brought by them claiming damages for breach of warranty and for negligence were heard recently before the President of the High Court and a jury in Dublin, and the hearing occupied six days. The company denied both negligence and breach of warranty. According to the evidence five persons who had meals in the car on the date in question suffered afterwards from typhoid, whereas three others who came in late and were refused a meal were exempt. In the opinion of the chief medical witness for the two ladies, the typhoid was due to a carrier. After a considerable body of evidence had been given on behalf of the company by members of the dining car and refreshment room staff, counsel for the two ladies said he was prepared to admit that the food had been wholesome when it reached the train, but he contended that it had become infected with typhoid bacilli in the dining car. Some very striking figures were given for the railway company showing the very large number of meals served in the dining cars and refreshment rooms during 1944 and the small proportion of typhoid cases among dining car passengers at the height of the epidemic. The two ladies succeeded on the warranty issue and obtained judgment for £200 and £100 damages respectively, with costs, while the company succeeded and was awarded costs on the issue of negligence. A stay of execution was granted.

#### Chinese Railway Training Programme

The first 39 of a group of 110 Chinese engineers who are to be trained on American railways have arrived in the United States, according to a recent announcement of the Office of Defense Transportation. The others are expected to follow later in the year. These English-speaking trainees are graduate engineers of Chinese colleges and have had a minimum of three years of continuous experience on railways in China. They have been selected for their ability, leadership, scholastic attainment, and aptitude for railway work, it is stated. While in the U.S.A. the Chinese will take a special course which has been worked out with the co-operation of American management and labour officials. They will receive practical experience, and frequently will be shifted from place to place. The training will take place on 12 railways with topographic conditions somewhat similar to those on Chinese railways. Western railways (which will take a total of 60 trainees) are the Santa Fe, the Burlington, the Milwaukee, the Illinois Central, the Southern Pacific, the Union Pacific, and the Great Northern. The other 50 will be assigned to five Eastern railways, namely, the Pennsylvania, the Baltimore & Ohio, the New York Central, the Louisville & Nashville, and the Southern. The move to give Chinese railway officials experience on American railways was initiated some time ago by the Chinese Government through China Defense Supplies Inc., now the Chinese Supplies Commission, which handles Lend-Lease negotiations with the United States Government.

#### Exhibitions at Charing Cross Underground Stations

An exhibition organised by the Federation of Civil Engineering Contractors at Charing Cross District Station last month was the 160th exhibition to be held at this station over a period of fifteen years. When Charing Cross Station was remodelled in 1929 the "exhibition site" in the booking hall was set aside for shops,

showcases, etc., similar to those which can be seen to-day at Piccadilly Circus Station. The idea was then advanced of using the site for exhibition purposes. It was served by three underground railways (the District, the Bakerloo, and the Morden-Edgware) and a daily average of 20,000 passengers used the three stations. The first exhibition was part of the London 'bus centenary celebrations, and ever since then exhibitions covering a wide variety of subjects have followed one another almost continuously. The largest number of visitors to see any one exhibition was in 1930 when a daily average of 12,000 persons visited a week's military show arranged by the War Office. Exhibitions mostly run for about 10 days, but some have continued for as many as six weeks. For the duration of the war, the Charing Cross site has been leased to the Ministry of Information, which has continued to present regular programmes that have included exhibitions for all the Ministries and the three Service departments. The Ministry of Information courteously permitted the Permanent Way Institution to stage a Diamond Jubilee exhibition last year. On one memorable occasion towards the end of the 1941 blitz their Majesties the King and Queen made an informal visit to the Life Saving at Sea exhibition.

### Wartime Communications in Iraq

The general scope of the Allied wartime lines of communication from the Persian Gulf port of Basra through Iraq to Khanqin and Persia may be inferred from the article entitled "Another Aid-to-Russia Route," published elsewhere in this issue. Just as the British Military Railway Directorate in Persia constructed the two new lines to the Gulf ports of Khorramshahr and Tanuma to increase the capacity of the Trans-Persian route, so the sister directorate in Baghdad built the Kut-el-Amara—Baquba line to improve the river-cum-rail route through Iraq to Persian soil. Though the Tigris remained an all-important inland waterway line of communications in the last war, its tortuous course and sandbanks made it desirable to supplement the steamer traffic by constructing parallel lines of railway between Basra and Amara and between Kut and Baghdad during the 1914-1918 campaign. The worst reaches of the river were thus short-circuited, and an even greater improvement in the Russian supply line has now been effected by connecting Kut directly with Baquba, obviating delays in and around Baghdad. Whether the Directorate in Baghdad has in view or in train any measures other than this Kut—Baquba section to increase the capacity of this general line of communications is not at present known, but those that suggest themselves are the conversion to standard gauge of the Euphrates line from Basra to Baghdad—to comply with the Ward through service scheme—together with its branches, and, possibly, an all-rail Tigris metre-gauge line from Basra to Baquba, by linking up Kut with Amara and restoring the Basra—Amara section. Probably the opening of the Black Sea route has made unnecessary any such measures not already in hand, though the Basra—Baghdad conversion seems likely to materialise before long, irrespective of aid-to-Russia needs.

### Locomotive Electric Lighting

For more than 100 years the lamps fitted to locomotives for recognition purposes, and to ensure safety in operation at night, have been of the oil-burning type. Many and varied were the lamp designs introduced by different railway companies throughout the country. Now, after the increasing use of electric colour-light signalling in place of oil-illuminated semaphore glasses, the head codes and tail lamps on locomotives are beginning to follow suit. On the L.N.E.R., as described elsewhere in this issue, some main-line locomotives have been equipped experimentally with electric lighting. The scheme embraces not only the head lamps and tail light but covers also the illumination of the gauges and controls in the cab. An especially convenient feature of the system is the provision of a control panel, in the cab, arranged in the form of an illuminated diagram that greatly facilitates the pre-setting of head codes. A complete set of lamps, back and front, obviates any necessity for changing the position of lamps for indication purposes; the only change involved is the bringing into operation of hinged white discs during daylight. The design and mounting of the generator supplying current to the lighting system present many unusual features, as will be seen from the illustrations accompanying the article on this interesting development in locomotive practice.

### 4-4-4-4 Locomotives for the Pennsylvania

Following the announcement by the New York Central System of its intention to introduce a class of 26 locomotives of the 4-8-4 or "Niagara" type for express passenger service it is intimated that the Pennsylvania Railroad is to build no fewer than fifty 4-4-4-4 passenger locomotives for its principal trains. With both companies a radical change is being made in a policy

which has persisted for many years. For several decades, while other United States railways have been building larger and larger locomotives, the Pennsylvania has continued to rely on its "K4s" Pacifics. This numerous class has no exceptional features; the working pressure of 205 lb. per sq. in. is relatively low by modern standards; yet, with the help of its locomotive testing plant at Altoona the Pennsylvania had produced, in these Pacifics, an extremely efficient series of passenger locomotives, which in their time have done very fine work, including the hauling of some of the fastest trains in North America. But as loads in excess of 800 tons made it necessary to run these locomotives in pairs, or resort to the use of 4-8-2 mixed traffic engines, the new 4-4-4-4 design has been evolved. There is no articulation; the four driving axles are in a rigid frame, but this arrangement gives the adhesion of eight-coupled wheels, while the moving parts are no larger and heavier than those of two four-coupled locomotives, and the design also has an advantage over the normal four-cylinder engine in that all the cylinders are outside the frames. The new passenger engines will be companions to the new Pennsylvania 4-6-4-4 non-articulated freight design, and apart from previous experimental engines, both set a new fashion in American locomotive practice.

### Mr. Alfred Raworth

DURING his railway career, Mr. Alfred Raworth, who retired recently from the position of Chief Electrical Engineer, Southern Railway, has been intimately associated with the development of the largest electrified suburban railway network in the world, as well as with the conversion to electric traction of a considerable mileage of main line. His father, the late Mr. John S. Raworth, was one of the pioneers of the electrical industry of this country, and to him Mr. Alfred Raworth acted as assistant before he was appointed Chief Assistant to the Electrical Engineer of the L.S.W.R. in 1912. He joined the S.E.C.R. as Electrical Engineer in March, 1918, and at the end of the same year visited the U.S.A. to study developments there in connection with the preparation of a comprehensive scheme for S.E.C.R. suburban electrification. That work was not carried out until after grouping, but Sir Herbert Walker arranged for Mr. Raworth to remain in charge of the whole of the Eastern Section of the suburban electrification. On the completion of that work in 1925 he was appointed Electrical Engineer for New Works and in that capacity he was responsible for the whole of the extensions of electrification of which the major were those from London to Brighton; to Eastbourne, Bexhill, and Hastings; to Portsmouth via Woking; to Bognor, Littlehampton, and Horsham; to Reading; and to Gillingham and Maidstone. Mr. Raworth assumed responsibility for the whole of the Electrical Department of the Southern Railway in 1938.

The nucleus of the company's present electrified network was consolidated in 1929, when the high-tension single-phase system disappeared and all suburban lines were standardised on the third-rail 660-volt d.c. principle. The company then embarked on conversions of main-line tracks, the first of which was the Brighton and Worthing extension, completed in 1933.

Before the beginning of main-line conversion the Southern Railway electrified suburban system comprised approximately 300 route-miles (800 track-miles). Before the outbreak of this war the electrified network had been more than doubled, and some 700 route-miles (1,700 track-miles) were being operated electrically. Mr. Raworth is the designer of the mixed-traffic electric locomotive, a description of which was published in *The Railway Gazette* of January 23, 1942. A portrait and biography of Mr. Raworth appear elsewhere in this issue.

### Railway Manufacturers and South America

THE railway engineering equipment supply industries of Great Britain have been intimately connected with the export trade since their earliest days and for more than a century they have found markets for a great part of their products overseas. In the revival of the nation's export trade they are fitted, therefore, to play a considerable part by reason of their long experience of meeting overseas requirements and by their especial knowledge of export needs. At the present time there is, all over the world, a great accumulation of deferred maintenance and renewals of railway equipment of all kinds which needs to be made good, and in most cases the "backlog" of orders which railway administrations would have placed but for the intervention of the war, extends over five or six years, and in the aggregate totals many millions of pounds.

The railway supply industries themselves have order books

which assure them of remunerative working for a considerable time ahead, and there can be no doubt that the potential trade awaiting them is very large. They are, however, fully alive to the necessity for developing the orderly marketing of their products and making early arrangements for meeting the needs of large markets on an equitable basis. They are, therefore, approaching the South American market, by the issue of a handsomely-produced technical publication in Spanish for the Spanish-speaking Republics and in Portuguese for Brazil. The Spanish publication is entitled "Progresos Técnicos en Material Ferroviario" ("Technical Progress in Railway Equipment"). Notwithstanding that it has been produced largely during the war, it compares more than favourably with anything that British trade competitors, eager to capture the markets of Latin America, have sent to these countries.

The trades which together form the railway engineering supply industries comprise a substantial part of British engineering. The principal products are locomotives and accessories, carriages and wagons and accessories, brakes and signals, tyres, wheels and axles, and springs. In all, more than 120 companies with a total capital of some £26,000,000 and employing about 60,000 persons, comprise the industries which in June, 1942, brought into being the Railway Engineering Supply Industries Joint Committee, which was the first body of its kind, and which was created at the suggestion of the Government to provide a means of co-ordination and co-operation. This joint committee has been of considerable value during the war years, when its members have been engaged on many forms of essential production. The basis of the organisation of the joint committee was the export groups, formed early in the war under the aegis of the Department of Overseas Trade, for each of the constituent industries. With the end of the war in Europe, the joint committee will be able to co-ordinate the efforts of its member groups in the development of overseas trade, and in this way to ensure orderly production and marketing. By this means it will be possible to avoid the scramble which occurred after the end of the last war, when also there was a large accumulation of railway orders which attracted new entrants into the industry and resulted in a considerable expansion of capacity, which later brought about its own disabilities.

The geographical distribution of the railway supply industries extends throughout the country from Scotland to the south of England. Many are situated in the Midlands, and a number in what, in the years between the wars, came to be known as special areas. Because of the considerable diversity of the products of these industries, they provide an important market for a number of raw materials, but their greatest demand is made on two of our staple products—coal and iron. These industries are among the largest users of both light and heavy machine tools, and a wide variety of other specialised equipment. Apart from the basic materials of coal and iron, the materials used by these industries embrace a diversified cross section of British and Empire products, and include cotton, linen, paint, varnish, glass, copper, rubber, asbestos, brass, timber, and so on. Apart from the substantial primary employment afforded by these industries, the effect of variations in their activity is very marked in many secondary trades. The success, therefore, which attends their endeavours to promote a steady flow of overseas trade, of which the present approach to the Latin American market is the first, will be of wider implication than to the trades immediately concerned.

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### A New Constitution for the Signals

**A**LITTLE more than three years ago the Council of the Institution of Railway Signal Engineers decided to appoint a Development Committee to consider and report on the advisability of making any changes in the Articles of Association—especially any affecting the rights and obligations of the various classes of membership—that might enable the objects for which the Institution was founded to be attained more effectively in future. Mr. James Boot, President for the difficult years 1939-43, was Chairman of this committee, which had the great benefit of expert legal advice from Mr. J. Griffith Hall, M.A., LL.B., Secretary of the Westinghouse Brake & Signal Co. Ltd. The committee reported in due course and submitted a complete new draft of the Articles of Association to the Council, which accepted them after making certain modifications and, having secured the consent of the proper authorities, laid them before the members for their approval and adoption. Their consent to the step was given on May 23, as reported elsewhere in this issue, and the new constitution is therefore now in force.

The Institution was incorporated towards the end of 1912. There had been another Institution of almost similar name established two years before that, but, for reasons which do not concern us here, it had to be brought to a close and the present body was formed from the membership of that short-lived predecessor. The need for a technical association to bring together those engaged in railway signalling and communication work in Great Britain had become increasingly felt in the early years of this century, to some extent possibly on account of the growing use of power and automatic signalling which, it was evident, would eventually effect great changes in the methods of conducting traffic on some sections of line. The numerous pre-grouping railway systems were then in existence, each of which, except in the case of some small lines, had its own signal department and telegraph or electrical department, its own designs of equipment and often its own methods of block working, although, of course, there was fairly general agreement on matters of principle. On one railway only, we believe, was the signal and telegraph combined in a single department. Outside purely official associations there was none able to cater for the needs of those engaged specially in railway signal engineering, and the new Institution, small though it was and hampered in its work within two years of its foundation by the 1914 war, answered a real want. That war over, its numbers gradually increased and eventually included members from all parts of the Empire, the U.S.A., and some Continental countries. Its field of usefulness grew steadily and a reading of a few volumes of its Proceedings and reports of its meetings in these columns suffices to show that its activities must have had a marked influence on practice in this country and even elsewhere.

In course of time, in 1922 and again in 1927, it proved advisable to make a few changes in the original Articles of Association, which had the effect of improving the financial position of the Institution and of opening the way to a new class of member from among those persons who were not signal engineers but whose work brought them into such close contact with the applications of signalling that they could contribute much of value to the Institution's debates. Since then conditions have changed still further and the railways are facing new problems. Signalling is becoming more scientific and the interchange of knowledge, experience and opinions among those concerned in it is becoming more than ever necessary. Education and training for signal engineering and telecommunications as applied to railways claim greater attention than ever before and the Institution, which, through the administration of its Thorrowgood Bequest, has done excellent work in this direction for 15 years, is having to consider the widening of this educational task and its activities generally, together with the re-arrangement of qualifications for membership. Other Institutions have had to do the same at different periods of their existence and indeed the Signal Engineers have profited by their example. The new constitution, the result, we know we can say, of much thought and care, gives greater opportunities than hitherto to certain classes of membership to take an active part in the Institution's work, establishes an additional class of member, intended to remove certain difficulties experienced in the past and which discouraged some persons from joining, and provides for more modern methods of representation on the Council and of election to that body. It also brings the Articles of Association into line with the most approved practice in the management of incorporated technical associations. In this way it should facilitate the work of the President, Council and officers and promote the professional interest of the members generally. We trust that the objects which the Council set before itself when it appointed the Development Committee will be achieved and that the work done by the latter will meet with its fitting reward. The Institution, more than most, perhaps, has had considerable difficulties to contend with during the war, but these are now happily disappearing, and we offer it, through its President, Major R. Falshaw Morkill, and his colleagues of the new Council just elected, at the head of which he continues in office, our best wishes for a most successful future.

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### Progress in Water Treatment

**I**T is safe to say that the last ten or twelve years have witnessed the most important discoveries yet made in connection with boiler-water treatment, especially when allowance is made for their probable influence on actual practice in the immediate future. Water treatment as a scientific process, however, has rather suffered at times from exceedingly scattered and unco-ordinated methods of presentation in the technical press, as a result of which

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it is somewhat difficult for the engineer, lacking specialised chemical knowledge, to get a true picture of the state of development of water-softening processes. Mr. A. J. R. Walter, a director of The Permutit Company, Limited, who is himself an engineer, has therefore rendered a most valuable service by presenting to the Institution of Mechanical Engineers a short but eminently readable account of the progress made in this field in the last ten years. We publish an abridged version of this paper on p. 541.

To Mr. Walter we are also indebted for the loan of Bulletin No. 448 of the American Railway Engineering Association, dated November, 1944, which contains some valuable observations on present-day trends in water treatment on American Railroads. There are two main portions of this booklet which are of interest to those concerned with boiler maintenance, and both are records of work of the Association's Committee on Water Service, Fire Protection, and Sanitation.

In the section dealing with "Cause of, and Remedy for, Pitting and Corrosion of Locomotive Boiler Tubes and Sheets," the work of J. F. Barkley is strongly criticised. Mr. Barkley was responsible in 1936 for the information given in a book, published by the Department of Interior, known as "Questions and Answers on Boiler Feedwater Conditioning." It is his answers to questions on the cause and prevention of caustic embrittlement which are now discounted. But it must be remembered that 1936 is a long time ago, when one realises—as one does after reading Mr. Walter's paper—how far boiler water treatment has progressed since then; and it may well be that Mr. Barkley's answers represented the latest ideas then extant.

The disagreement here is mainly over the ratio of sodium sulphate to total sodium hydroxide and carbonate alkalinity (calculated as equivalent sodium carbonate). The Committee now finds that the sodium ratios recommended by Barkley are "entirely worthless as an inhibitor for embrittlement." They also denounce the pressure brought to bear upon undertakings using water treatment, to persuade them to follow these recommendations, which, in addition, often resulted in locomotives being rendered inoperable because of foaming. The section concludes with a note on the use of the caustic embrittlement detector (in the development of which the A.R.E.A. was associated) and on the use of tannin and sodium nitrate for embrittlement prevention. The Department of Interior, which formerly recommended methods of embrittlement prevention, now shown to be worthless, has finally recognised the leadership of railway water engineers in this field—to the undisguised gratification of the A.R.E.A. Committee.

The other report relating to boiler water behaviour in this Bulletin is entitled "Mechanics of Foaming and Carry-over in Locomotive Boilers," and is the more important of the two. It deals with experimental work done by the Committee on evaporation at atmospheric pressure, in which the effect of volume rate of evaporation, and the effect of suspended matter, have been investigated. An effort to check some of the data obtained was also made in a commercial laboratory, using a boiler pressed to 100 lb. per sq. in.

The tests at atmospheric pressure were made in a vertical iron boiler 5 in. x 6 in. in cross-section and 24 in. high, heated by five 500-watt heaters, and covered with asbestos board. Distilled water and pure chemicals were used. Data were obtained for the foam height for various rates of evaporation, showing how it builds up as concentration is increased; concentrations up to 2,000 grains were investigated. The experiments showed that for any volume rate of steam liberation, there is a limiting foam height which does not depend upon composition. This limiting height is reached, for any particular volume rate, at a concentration of 150-400 grains of dissolved solids, depending on the composition and the rate under consideration. The effect of organic matter was shown to be variable; it may or may not stabilise foaming under various conditions; and further investigation is necessary.

In the commercial laboratory already mentioned, 150-grain concentration, of varying composition, was used, at 100 lb. per sq. in. pressure;  $3\frac{1}{2}$  in. of foam was obtained, regardless of composition. The steam upflow rate was estimated at  $3\frac{1}{2}$  ft. per min. According to the graphs supplied with the report, only  $1\frac{1}{2}$  in. of foam should have existed; the extra amount may be due to the relative condition and size of heating surfaces in this boiler, or to differences in circulation conditions, or to the pressure. A variation in evaporation rate was obtained by changing the number of heaters in use.

Calculations have been made on the steam evolution rate from the tube and firebox sections of three large locomotive boilers, on the basis of the volume of steam and the area at water line with 1 in. of water in the glass, on level track. One of the remarkable

results of these calculations was the range—from 9½ in. to 60 in.—of the foam height. The tabulated results are considered to show why some classes of boiler carry their water better than others, and indicate the possibility of designing a boiler that will not foam under ordinary conditions.

Reference is also made to the possibility of preventing foam by mechanical means, e.g., a grating, with a slot for the passage of rising steam bubbles, extending the whole length and almost the full width of the boiler, set just above the top flues. Another idea is the use of conical nozzles in the steam space.

Coming to the effect of suspended matter, it has been found that calcite (stable crystalline calcium carbonate), either precipitated inside the boiler, or added to it later, increases the foam height only if an appreciable amount of foam is caused by dissolved solids. The maximum foam height due to combination of calcium carbonate and dissolved solids corresponds to the limiting height due to the rate of evaporation; this is an important factor in the design of mechanical foam suppressors. Freshly precipitated magnesium hydroxide first depresses foam height, and subsequently increases it. A mixture of two parts of calcium carbonate to one part of magnesium hydroxide slug-fed into the boiler will, after a period of boiling, reduce the foam height to the "dissolved solid" value. (The immediate effect is to raise the height to 20-30 in., after which it settles suddenly to 4-5 in.). This phenomenon is repeated, with diminishing intensity, in "cycles" until a constant condition is reached in about half an hour. The cause of this is unknown, but the same considerations probably govern the reason why "sludge" (calcium carbonate, magnesium hydroxide, and other suspended matter) will, if introduced slowly into boiler, act as a foam destroyer.

## LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

### A Verse from India

F.A. & C.O.Os' Office, M. & S. M. Railway,  
P.T. Madras, India. May 3

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I enclose herewith a small poem for favour of publication. I am not altogether unaware of the disadvantage at which I have placed myself in attempting it in a language that is not native to me. However, one prospect is promising to me: a faulty poem from India will be a source of greater entertainment than it would be, if otherwise.

Yours very truly,

M. V. SIVANANDAM

[The verses referred to are reproduced in our "Scrap Heap" page.—Ed. R.G.]

### "C.T.C. Possibilities in Scotland"

Westinghouse Brake & Saxby Signal Co. Ltd.,  
82, York Way,

Kings Cross, N.1. May 24

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—We have perused with interest the article on "C.T.C. possibilities in Scotland" appearing in your issue of May 4.

Possibly because we are manufacturers of C.T.C. apparatus, we have been asked whether we are responsible for this article. As you are aware, this article was not written, nor was it authorised by this company, and as it is difficult for us to discuss this matter with our many clients, we should be glad if you would give publication to this letter.

Yours faithfully,

J. GRIFFITH HALL,

Secretary

[We do not follow our correspondent's reference as to the article not being "authorised." Nobody except the Editor decides what is to be published in this paper. The article in question was written by one of our regular contributors on signalling matters, and was not submitted to any railway company or manufacturer.—Ed. R.G.]

### Alternatives for "Enthusiast"

Essex House, Essex Street,  
Strand, W.C.2. May 19

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Major R. M. Robbins has appealed to you (or failing you to your readers) to suggest a description alternative to that of "Enthusiast," wherewith you had "labelled" (? labelled) him, a term which he finds redolent of "football matches and religious revivals." Being—as we well know—neither a "fan" nor a fanatic, Major Robbins not unnaturally objects to being

so described, and I would like to give tangible evidence of my sympathy with him by joining in this new "Missing-word" competition.

*Railspile* lacking euphony and *railwayist* being sloppy and *railwayac* offensive, I would venture to append to my signature an epithet that possesses a sonorous rotundity worthy of the breadth of the subject matter involved.

Yours faithfully,  
KENNETH BROWN,  
Railwayologist

### Revolving of Locomotive Boilers during Repairs

P.O. Box 546, Haifa,  
Palestine. May 11

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR.—I had become accustomed to watching with complacency locomotive boilers being turned over for twenty-eight years before it struck me that the universal and time-honoured custom of slinging them off-centre and wrestling with them between repeated temporary packing operations until a position was eventually attained, "which would do," wasn't so very cute; it wasn't particularly safe, even, and it certainly absorbed more time and energy, when repeated, say at least four times in the course of a standard heavy repair, than was warranted.

There was, too, an indirect consideration, even more worthy of the attention of the management, namely, the dodging of the operation and its adverse effect on costs and quality. This seemed to be accounted for by the following.

All hands were not equally adept at the operation.

It required "sea-room" which was not conveniently available at any required moment.

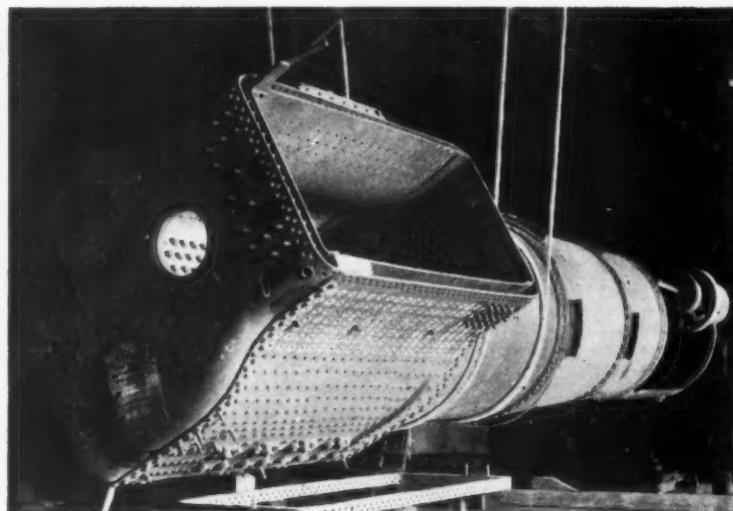
The amount of man-handling of packing and sling gear did not

very important there is no limit to the precision of the angular movement obtainable by inching.

The spread of the two slings in this case is forty inches, and the one tackle is used for some ten types of boilers, and it is surprising how little the location of the domes is found to interfere with the placing of the slings for balance of the various types in various states of dismantling, such as tubes in or out, half sides out, etc. The type selected for the picture specially to show a case in which slight balancing is necessary with tubes and foundation ring out, has the balance weight consisting of the suitable number of discarded wheel-centres and piston heads threaded on a bar and clamped at the most remote spot available. By usage the number of weights required becomes familiar. For dropping a boiler into the frame the tackle is the answer to an erector's prayer.

The snag is, of course, that two crabs on one crane or two cranes, on the same rails or one below the other, are needed. Cranes in parallel bays mean that the boiler can be turned only adjacent to the columns common to both bays and then removed in the desired position.

Despite its simplicity, I have never seen it employed precisely in this form, nor have I seen it illustrated in any journal with the specific purpose of showing it especially. That, of course, proves nothing, but further, I have never remarked it by chance in a general photograph of a boiler shop, and no one that I have asked amongst locomotive acquaintances has seen it employed elsewhere. I have been told by a well-known technical journal that it has been employed for the last fifty years by ship-builders and gun manufacturers, but as I feel that it is quite likely that it was used by the ancients, the information still seemed beside the point. The same paper said that it had been employed for a long time at the works of at least one of our four main-line railways, but as one eminent authority qualified a



*A locomotive boiler in the sling gear*

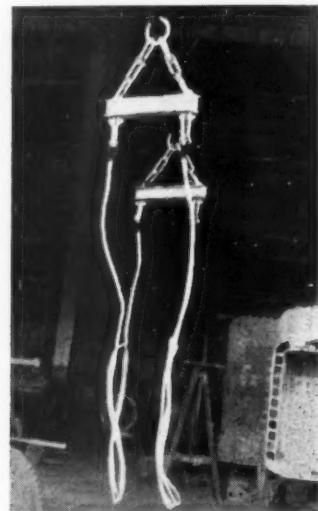
render it the ideal job for cooling off before the hooter, particularly if luck was not in attendance.

At the best, "tomorrow" would always be voted a suitable day for it; at worst, rather than turn the boiler, tradesmen would exhibit their prowess as contortionists when what was wanted was good class work such as could be assured by a normal comfortable working position.

Half the battle was over with the realisation of what a poor show was being put on with the aid of such infinitely versatile performers as a crane and some wire rope with trimmings. That was 1934.

The brighter turn that suited me is pictured in the two illustrations and is self explanatory, with the additional information, perhaps, that the crane available had two crabs, each independently controlled in accordance with ordinary practice.

Not a square foot of extra floor space is required, beyond that occupied by a boiler resting on its side. Men on adjacent boilers are not disturbed, either physically or from apprehension. The sling gear is left hooked on a column when not in use. The operations are to hang one end to the hook of one crab, pass twice round the barrel and up to the hook of the second crab. The boiler is lifted clear and the turning made by hoisting with one crab and lowering with the other simultaneously. If it is



*General view of sling gear*

similar statement by adding "something of the kind" and continued that there was at least one works where they counterbalanced the firebox legs and readily rotated the boiler in a confined space, I, rightly or wrongly, put two and two together, and concluded that both had the same thing in mind and that it was not the simple winding operation I have employed. I have in recent years seen a picture of what I took to be a heavy gun forging slung in a mammoth block chain, infinitely costly compared with wire rope, the turning of the forging under the hammer being effected by a massive sprocket on which the upper end of the endless chain was hung. A friend of my apprentice days, now C.M.E. of a railway abroad, said he was turning boilers in accordance with the old prescription, but had he had two cranes he supposed he would have used the method adopted by me.

I am wondering if you would be so kind with your wide experience of locomotive repair practice to decide the vexed question with chapter and verse, or, should you deem it a matter of interest to your readers, invite them to do so. I can not imagine there could be any reluctance to divulge the information, as obviously there could be no considerations of protection or patent.

Yours faithfully,  
A. L. JONES

## The Scrap Heap

HINT FROM BILLY BROWN  
Remove this stuff! Procrastination  
Still makes us miss our proper station

L.P.T.B. REPLY

From London Transport comes this reply to my Billy Brown couplet alleging procrastination in taking the anti-splinter nets from the windows of trams and buses: 'Tis gone from many a bus and train; But labour problems still remain.

—From the "Londoner's Diary" in "The Evening Standard."

\* \* \*

### LACK OF OFFICIAL FORESIGHT

Once again the authorities are caught out. With fishermen now trawling the North Sea, labour and transport should be at the ready. But in the customary last-moment panic, it seems that Britain will have to fall back on German prisoners-of-war to land fish.

As with water shortage during drought, with fuel limitation in severe cold, traffic delays in fog, hold-ups in potato supplies, we suffer from lack of official foresight. The controllable events are treated as "acts of God" and to be met by rushing around at the last moment.

This constant experience leaves plain citizens dumbfounded, but there is no excuse for official paralysis.—From "The Star."

\* \* \*

### WHAT IS NATIONALISATION?

The worst feature of the present cry for nationalisation is the uncertainty as to what the word means. I have nowhere seen anything approaching an exact definition of what is meant by, and what is to be substituted, for free enterprise. I cannot, I feel, do better than quote *The Economist* on this subject: '25 years ago, no doubt, the proposal to nationalise the basic industries was revolutionary and exciting. Nowadays all save the most simple-minded will want to know what it means. What sort of industrial policy would these nationalised industries pursue? Would they go out for productive efficiency and low prices, or would they seek still more secure protection? If the former, how would they obtain the resources to modernise themselves? What would be their labour policy—ever higher wages for ever shorter hours, or a real

## THE RAILWAY GAZETTE

attempt to secure high earnings through high productivity? How would a nationalised Bank of England differ from the present bank—and would the differences be good or bad? What steps would be taken to guard against the loss of managerial efficiency which could be expected *prima facie* from public ownership?' To none of these essential questions do the advocates of nationalisation give any answer."—Lord McGowan at the Imperial Chemical Industries Limited annual meeting.

### 100 YEARS AGO

From THE RAILWAY TIMES, May 31, 1845

**THE EAST INDIAN RAILWAY COMPANY.**  
—Provisionally registered.—Capital, £1,000,000; in 80,000 shares of £12.50 each. Deposit, 5s. per share, being the largest deposit allowed by the Act 7 and 8 Vic., c. 110, which limits the deposit on shares in a Company until final registration, to 10s. per cent.

**BOARD OF DIRECTORS.**  
Chairman—Sir George Larper, Bart. (Messrs. Cockerell and Co.)  
Deputy-Chairman—Bazett D. Colvin, Esq. (Messrs. Crawford and Colvin and Co.)  
Sir Guy Barclay, Esq. (Messrs. Barclay, Brothers, and Co.)  
Alexander Beattie, Esq. (Messrs. Beattie and Co.)  
C. D. Bruce, Esq. (Messrs. Fletcher, Alexander and Co.)  
Sir John Campbell, K.C.H. (Deputy Chairman of the Peninsular and Oriental Steam Navigation Company.)  
Major-General Caulfield, C.B. (Late of the Honourable East India Company's Service.)  
T. S. Kelsall, Esq. (Messrs. Kelsall and Co.)  
John Pastor Larke, Esq. (Formerly of the Bengal Civil Service, and President of the Marine Board.)  
Captain Alexander Nairne. (Formerly of the Honourable East India Company's Service.)  
Edward Howley Palmer, Esq. (Messrs. Palmer, Mackillop, Dent, and Co.)  
William Scott, Esq. (late of Madras—Messrs. Scott, Bell, and Co.)  
John Stewart, Esq. (late of Bombay.)  
Managing Director—R. Macdonald Stephenson, Esq.

**AUDITORS.**  
R. F. Gower, Esq. (Messrs. Gower, Nephews, and Co.)  
Captain Farquharson, R.N.  
**Bankers**—Messrs. Glyn, Halifax, Mills, and Co.  
**Solicitors**—Messrs. Freshfield.  
**Consulting Engineer**—J. M. Rendell, Esq., F.R.S.  
**Secretary**—  
**Temporary Offices**—9 A, Austin Friars.

The gentlemen who form this association have had various communications with the Court of Directors of the Hon. East India Company, the substance of which will be found in the correspondence between Sir George Larper and Mr. Stephenson on the part of this Company, and Mr. Melville, the Secretary to the East India Company, published with the prospectus.

The operations of the Company will be under the direct superintendence of the Government of Bengal; and the working thereof to be subject to the inspection and sanction of their officers, so as to bring the arrangements into a position as nearly analogous to that of the British railroads, under the Board of Trade, the only circumstances of the case being that the former is under practicable.

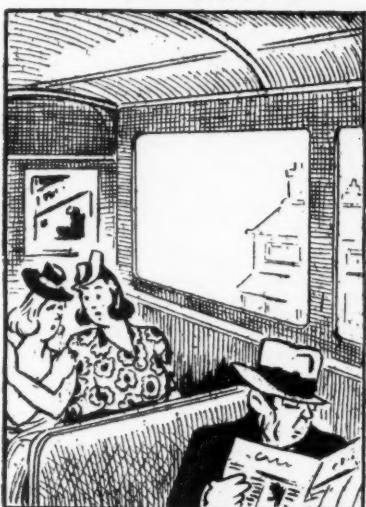
The deposit to be made on subscription will be 5s. per share, which is the extreme amount allowed to be taken as a deposit on a share of £50 by a Company previous to complete registration.

### Indian Railway War Savings Van



The National Savings Fortnight recently organised in Bombay, culminated in a procession of military and civilian vehicles. Above is a vehicle exhorting the public to travel less and save more, which joined in the procession on behalf of the G.I.P.R.

## OVER-EXPOSED



"But, my dear, one feels positively undressed now they're taking the net off the windows."

By Gittins, in "The Evening News"

### CHIEF EXECUTIVE OR CHIEF EXECUTOR?

When correcting a proof last week, we found that our printers had changed "chief executives of a main-line railway" to "chief executors of a main-line railway". Is this a direct hint of nationalisation to come?

### AN ACCOUNTS OFFICE CLERK (INDIAN RAILWAY)

Accounts Office is where I work;  
I hold the *status* of a clerk.  
(Why that mischievous mirth in you,  
What makes thee look with gleeful hue?)  
Strewn around me you will see  
Books as thick as dictionary:  
Junction rate lists intricate,  
Cumbersome tariffs, schedule rate.  
Oh! The railway rate construction  
Is one maze of great confusion—  
Combined rule, diff'rential rule,  
Many a varying terminal.  
A railway client curses me  
That he'd been charged inhumanly.  
Charging short-distance more than once  
O'er single haul is sure an offence.

I have no voice to say such things.  
I sh'd mind my work and lo! there springs  
Doubt regarding routing, rating  
DRS., endorsement is it lacking?  
Working 'greements cloud my brain,  
Mileage division mars our gain.  
I rack my brain on shortest route,  
Classification doubt and mute.  
Important work, I think, I do.  
Experts say it's difficult too.  
Traffic receipts do mainly form  
Our railway earnings. I perform  
All the checks and thus safeguard  
From revenue leakage and the fraud.  
Against the stations debits I raise  
With calculations much precise.  
Some traffic staff there frets and fumes  
An' in abuses self-consumes.  
A.O.s, pay no words of praise  
S.M.s, say my heart is ice.

More and more thus encouraged  
By poverty crippled and caged  
I've blossomed into an aged man  
With rickety children lank and lean.  
Oh God! almost my life is spent.  
Let me present a face content.

M.V.S.

## OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

### SOUTH AFRICA

#### Air Services

The Minister of Transport, speaking recently in the House of Assembly, said that it was intended ultimately to provide a 20-hour air service between South Africa and Great Britain, but that at the beginning the flight would take about 70 hours. It was premature to indicate what the fares would be, but he did not think they would be very different from existing fares. In addition to the main trunk service to Great Britain, it was intended that South African Airways should operate regional trunk services between Johannesburg and Nairobi, and to Bulawayo, Salisbury, Elisabethville, Leopoldville, South West Africa and Lüderitz. Those services would be reciprocal in that everything the Union asked from the Portuguese the Portuguese would seek from the Union; but Southern Rhodesia and Kenya did not contemplate operating in the reciprocal service.

### INDIA

#### Road-Rail Transport Companies

A White Paper on the policy concerning a proposal for road-rail transport companies has been forwarded to all provinces by the War Transport Department and the Railways Board.

The railways may hold from 25 to 45 per cent. of the shares in the companies. Each company is to consist of four parties: (1) operators; (2) railways; (3) provincial governments; (4) users. The railways and the companies are to enter into agreements to establish complete co-ordination in respect of timings and stopping places on parallel routes. At first, the services mainly would be for goods, over short distances; buses are to be obtained later.

#### Tourist Traffic

At the opening of the first meeting of the Tourist Traffic Committee, under the Chairmanship of Dr. John Sargent, recently, Sir Edward Bentall, War Transport member, Government of India, said that the scheme for the development of tourist traffic had two aspects, utilitarian and cultural. The utilitarian aspect was to examine whether it would be possible to build a valuable income for India from foreign tourist traffic after the war. From the cultural point of view, it was desirable to show to foreigners the best things in Indian life, past and present. He declared that the slogan, "Travel You Must," would take the place of the slogan, "Travel Only When You Must," after the war.

### CANADA

#### Railway Freight Traffic Costs

Mr. Frank A. Gaffney, Transport Economist of the Canadian National Railways, in the course of a talk entitled "Facing the Facts" before a meeting of the Rotary Club, Brockville, Ontario, recently, stated that Canadian railways were moving freight traffic at an average cost of less than one cent a ton-mile. That low cost was approached by only one other country, the United States.

Mr. Gaffney said that the users of the highways, particularly heavy commercial vehicles, were not "paying for them. To substantiate that statement, he referred to the reports of two Royal Commissions in the Provinces of Ontario and Nova Scotia which, after having made thorough studies of costs and their allocation among vehicles, had recommended an increase of at least 100 per cent. in licence fees for the

heavier-class vehicles. In general, he added, it cost four to five times as much to move traffic by lorry as by rail, and the fact that competition on a rate basis was possible was due entirely to the nature of the railway rate structure.

However, the common belief was that road transport was cheaper, because on the traffic moved by lorry the rate charged the public was generally less than the rail rate for the same movement. That cutting of rail rates was made possible by the fact that lorries only would move traffic bearing high rail rates. They would not touch traffic which paid the railways only one-half cent to three cents a ton-mile. But the movement of that cheaper paying traffic, such as wheat, to both seaboard, so that it could be sold in world competitive markets, Nova Scotia coal to Quebec and Ontario, and newsprint from Quebec to the United States in competition with the local product and that of other countries, must be made in the national interest.

#### Railways as Basic Transport Agency

Continuing, Mr. Gaffney said that no one could deny that the highway vehicle had a proper place in the country's economy. That the railways were, and must remain, the basic transport machine was equally true. Therefore, it would seem reasonable that proper co-ordination of those two mediums to the end that each should perform the service for which it was best fitted would be in the national interest. Co-ordination could be accomplished only by the creation of a federal control body with jurisdiction over rail and highway services. It could not be done while railways were regulated by a federal agency and highway services were in the hands of nine different provincial commissions.

In conclusion, the speaker said that there was much talk of mass production in the future; but that there would be no mass production without mass transport and that mass transport in Canada was transport in trains on tracks.

#### C.P.R. Post-War Plans

Mr. W. M. Neal, Vice-President of the Canadian Pacific Railway, on his return from a recent inspection tour of the company's properties, said that the speeding up of the surveys and plans in progress to meet Canadian and world-wide transport needs during the post-war era and a continuation of the efficient handling of heavy traffic were the two most important tasks in transport facing the Canadian people. "Canadians from coast to coast," he said, "while still deep in the war with all their strength, are undoubtedly already looking and planning beyond war's horizons in order to assure this country its proper place and share in future world trade. People in western Canada are as keenly aware of the importance of sustained and prosperous export trade as those in eastern Canada, and their plans include an intensive preparation for the change-over from wartime to peacetime markets and practices."

Continuing, Mr. Neal said that the Canadian Pacific Railway was as keenly alive to the situation as were other Canadian institutions. From long experience it was realised that the first requisite for a prosperous trade was a strong, efficient transport system. With that end in view, the company already had prepared exhaustive surveys in the locomotive, freight, passenger carriage and associated fields, and indeed was already conducting practical experiments within the limits imposed by the necessary Government restrictions

on essential steels, chemicals and other materials. Preparations for the fast and efficient handling of overseas trade had been in progress for some time, and those undoubtedly would provide not only for the re-establishment of the famous Pacific fleet but also for a resumption on a full scale of that service between the North American and European continents which, before 1939, had played such a large part in world transport.

### BRAZIL

#### Railways and Road Competition

With the shortage of petrol, railways not only have enjoyed some respite from competition but have been worked far beyond capacity. Maintenance has suffered as a consequence, and the delay which inevitably will take place between the cessation of hostilities and the time when re-equipment can be brought up to date will represent a trying, if not critical, period for the railways. Although prices for fuel and materials may return to normal in a relatively short time, periodical increases in wages have imposed a permanent burden on the fixed charges of the railways which it will be difficult, if not impossible, to offset, even with the passage of time. Rather will matters tend to revolve in a vicious circle; for rates and fares must continue to be high if the fixed expenditure is to be met, and high rates and fares must, in turn, result in a loss of much traffic to the roads.

#### Road Construction

A brief outline of the development of the roadways plan of the State of Rio de Janeiro will serve as an example of what many railways probably will have to face in the way of competition because of road construction. A good road between Niteroy and Campos, approximately 190 miles long, is already completed, as is another between Niteroy and Friburgo, some 80 miles long. Barra Mansa has been joined to the Rio de Janeiro—San Paulo highway by a branch road. The zone of the Serra do Mar, between Paracambi and Paulo de Frontin, is provided with suitable roads, and another road from Itacurussá now joins up with the Rio de Janeiro—San Paulo highway. In the zone of the Leopoldina Railway further roads between Cambuci and Funil, in the valley of the River Parahyba, and between Iguá and Alcantar, passing by Venda das Pedras and Itaborahí, are completed.

Plans for the current year include one for a road between Angra dos Reis and the Rio de Janeiro—San Paulo highway, and one for a road between Alcantara and the Largo do Moura in Niteroy. Roads are under construction between Niteroy and Maricá; between Cabo Frio and Arraial do Cabo; and between Macaé and Glicério.

#### Future Construction

Next year should see the completion of a road from Niteroy to Rio de Janeiro along the edge of Guanabara Bay, although this depends on the completion of three bridges of difficult and expensive construction. Finally, highways are to be built between Barra do Piraí and Piraí; between Andrade Pinto and Vieira Cortez; between União Industrial and São José do Rio Preto in the municipality of Petrópolis; and between Nova Iguaçu and Miguel Pereira, via Queimados, Caramujos, Belém, Paes Leme, Sertão, Bomfim, and Governador Portella.

Orders have been given for the construction of roads between Itaperuna and Campos, by the valley of the River Muriaé; from Elesbão to Madalena; from Morro do Coco to Jundiaí; from Pati to Petrópolis; from Jurumirim-Parati to Parati; and from Rio Bonito to Gavioés.

## Modern Methods of Water Treatment\*

### *A survey of the major advances in the chemical treatment of water during the last ten years*

THE two fundamental processes of water softening discovered during the last century are the lime-soda process discovered by the Aberdonian Dr. Clark in 1841, and the base-exchange, or zeolite, process discovered in Germany by Dr. Gans about 1907. In the former the hardness-forming (calcium and magnesium) salts are converted partly into sodium salts, which remain in solution, and partly into insoluble salts which are precipitated in settling tanks. In the base-exchange process the calcium and magnesium salts are wholly converted into soluble salts of sodium. During the last nine years new principles of far-reaching importance have been discovered in the fields of both these processes; as a result, there is now available to the user a series of treatments ranging from the simple removal of the calcium and magnesium salts to the complete removal of all salts ("deminerallization"), which gives a product equivalent to distilled water.

In efforts to improve the lime-soda process, sand filters were tried, to improve the clarity of the treated water. But it was found that, due to after-precipitation of calcium carbonate (present in an unstable condition in the treated water) the sand grains tended to cement together. It was also noticed that some softening action took place in these filters, so that a lower final hardness was achieved.

It was at last realised that herein lay the basis of a revolutionary water-softening principle, *catalytic crystallisation*, which would overcome the major difficulties (slowness at low temperatures; incomplete precipitation; bulky sludge) previously encountered in the process. Experiments showed that the new principle reduced the time of the softening process to less than five minutes, and that the charge of granules served as nuclei round which the calcium carbonate (formed by the addition of lime) could be built up in compact form.

#### Method in Practice

In practice an inverted conical tank holds the granular catalyst. The chemical and raw water inlets are arranged tangentially at the bottom of the cone, and give a turbulent spiral motion to the incoming water and chemicals, hence the name "Spiractor" which has been given to this type of softener. The great advantages are (1) only a small reaction tank is needed; (2) the efficiency is high; (3) the process takes only 5-10 minutes instead of 3 hours or more; (4) the cost of the catalyst is negligible; (5) the resultant water is stable and after-precipitation is absent; and (6) the process is clean and the sludge removal problem is solved. The process is chiefly applicable to waters containing temporary hardness, or where a low final hardness is not required. For boiler water, it is suitable when only temporary hardness is present; if permanent hardness exists, the base-exchange process should follow, to remove it.

While the Spiractor process was being perfected, C. H. Spaulding of Springfield,

Illinois, produced a new lime-soda plant which he named a "Precipitator." In this plant, precipitates are not allowed to settle, but are kept suspended within controlled limits by mechanical agitation. The working principle embodies the fact that a particle can be supported by an upward stream of water if the velocity is high enough for the friction of water on the particle to equal the pull of gravity.

Thus both chemical and hydraulic processes (precipitation and separation respectively) are involved. The Precipitator is designed so that the precipitates separate from the water at a sharply defined level, below which the suspended "blanket" of sludge acts as a filter to catch other upward-rising particles. Because the sludge is in continuous motion, it may be blown down from the bottom of the "blanket" automatically. The chief advantages of the Precipitator are: (1) short detention time (1 hour instead of at least 4 hours); (2) lower chemical requirements; (3) absence of settling; (4) low turbidity; and (5) lower effluent hardness. The process is particularly applicable to municipal water treatment, breweries, evaporator feed, low-pressure boilers, and paper-making.

#### Modification of Lime-Soda Process

A novel modification of the lime-soda process, involving the application of heat, was introduced in 1937 in a London boiler-house, and has since been applied in many boiler-houses elsewhere. Live or exhaust steam is fed into the space above the water level in a reaction tank, designed for a working pressure of 5 lb. per sq. in. Water entering the softener is sprayed through this space, whereby the bulk of the oxygen is removed and the water heated to within 3 deg. F. of the steam temperature. Lime and soda are proportionately fed into the top of the tank by means of an electrically controlled chemical pump. Here the high velocity of the sprayed water agitates the surface and mixes the chemical intimately with the water. Precipitate settles to the bottom and is drawn off through a sludge removal valve, while the slightly turbid water passes from the uptake chamber to non-siliceous filters which render it crystal clear; and once or twice a day the filter is cleaned by a wash-water pump. Water thus treated has a final hardness of 0.5 part per 100,000 and is delivered at about 200 deg. F. The chief advantages are: (1) the process is very rapid; (2) final alkalinity is low; (3) large excesses of lime and soda are unnecessary, owing to the completeness of the chemical reactions; and (4) only a small reaction tank (1 hour's capacity) is needed.

The principal development in the field of base-exchange water treatment is the introduction of the "hydrogen ion process." Base-exchange materials (zeolites) are in effect cation exchangers; they remove sodium and magnesium cations present in the water by exchange with the sodium present in the zeolite. Regeneration of the zeolite is effected by sodium chloride, to restore sodium to the exhausted bed. Thus water is obtained having no hardness but containing sodium salts (chiefly bicarbonate) equivalent to

the total anions in the raw water. Research started about ten years ago, aimed at the elimination of the bicarbonate; and so the hydrogen ion exchange material (hydrogen zeolite) was developed.

When water is passed through a bed of hydrogen zeolite the calcium, magnesium, sodium, and other cations are replaced by a corresponding amount of hydrogen.

The effluent which is produced is free from all metallic ions and contains acids in concentrations corresponding to the original concentrations of bicarbonate, sulphate, and chloride ions, i.e., all alkaline bases are removed and their salts converted to the corresponding acids; the hydrogen zeolite is duly regenerated with a weak solution of sulphuric acid. By this process bicarbonates are removed almost completely. The acids formed in the effluent (as mentioned above) are removed by adding an alkali such as caustic soda, so that they are converted to the corresponding sodium salts. The resulting water will thus contain no hardness. The chief advantages of the process (though it costs slightly more than normal lime-soda treatment) are: (1) simplicity in operation and control; (2) obviation of sludge disposal problems; and (3) elimination of after-precipitation difficulties.

Obviously the hydrogen ion process, first used commercially in this country in 1935, marked a great step forward in water treatment. Large numbers of plants are now in use. But it was realised that if only the acids created in the process could be absorbed, it would be possible to remove all the salts from normal water and in fact produce "distilled" water without distillation.

Two research workers, Adams and Holmes, discovered a means to this end and experimented with the first known acid absorption material—a synthetic resin which absorbed acid and could then be regenerated by an alkali. Acid water passed through a bed of this material had all its acids removed. No exchange took place, so no additions to the water were made. Once saturated with acid, the bed is regenerated with a dilute solution of caustic soda.

Combination of hydrogen ion exchange and acid absorption thus form a means for the complete removal of all salts. As a result of intensive research in this direction, the "Deminrolit" process has been perfected. Nowadays, large volumes of water can be produced by it, containing about 1 part per 100,000 of total solids, at a fraction of the cost of distilled water. In practice, the treatment is carried out in two steps, the raw water being first passed through the hydrogen ion unit, and then through the "de-acidifying unit" wherein all acids formed during the first step are removed. Silica, however, is not eliminated, and if excessive, must be dealt with in a silica removal plant before the demineralising treatment.

The cost of the treatment depends largely on the nature of the raw water. If much bicarbonate is present, with little sulphates and chlorides, only a small plant is needed, and the cost is low. Where the latter form a high proportion of the total solids, plant and operating costs are higher. The measuring and handling of the dilute acid can be done automatically; and the whole cycle of operations can be controlled electrically or manually. The first commercial plant embodying this process began working in 1937; since then 35 others have been installed. They are used for make-up (Continued on p. 552)

\* Paper by A. J. R. Walter, issued by the Institution of Mechanical Engineers for written discussion. Abridged

## Recent Signalling Developments—2\*

*Pre-war progress in Great Britain, with some indication of how the latest technical developments might be applied to post-war traffic problems*

By O. S. NOCK, B.Sc., A.M.Inst.C.E., M.I.Mech.E., M.I.R.S.E.

IN preparing a modern scheme of signalling for a busy junction, or a large terminal station, a choice of control machine has to be made between an ordinary power frame, with positively-interlocked miniature levers, and a control panel with non-interlocked thumb-switches. The principal advantage claimed for the control panel is that, by reason of its compactness, it makes easier the work of the signalman and so permits, in certain circumstances, of a larger area

sible of the exact whereabouts of trains approaching the controlled area.

The Westinghouse route-relay interlocking system is in use at this particular junction. The control machine differs from all types so far considered in the important respect that the thumb switches are mounted on a sloping keyboard, and not on the track diagram. This avoids the groups of thumb-switches that are so marked a feature of the Thirsk control machine, and enables the panel to be

signal are grouped; to enable the signalman to pick out the switch for the route he requires to set up, a chart is provided on the horizontal shelf extending forward from the machine, and this chart shows at a glance the route to which any thumb-switch applies. In practice an experienced man is always so thoroughly familiar with the instrument that he hardly ever needs to refer to the chart at all. The chart, however, becomes invaluable on occasions when relief men are staffing the particular box.

The routes set up lead from one signal to the next, as will be seen from reference to the diagram Fig. 5 which illustrates a typical junction layout. Signal A, the branch home, leads over the trailing points on to the main-line and up to the platform starting signals B; only one route is possible from signal A; that is from A to B. The platform starting

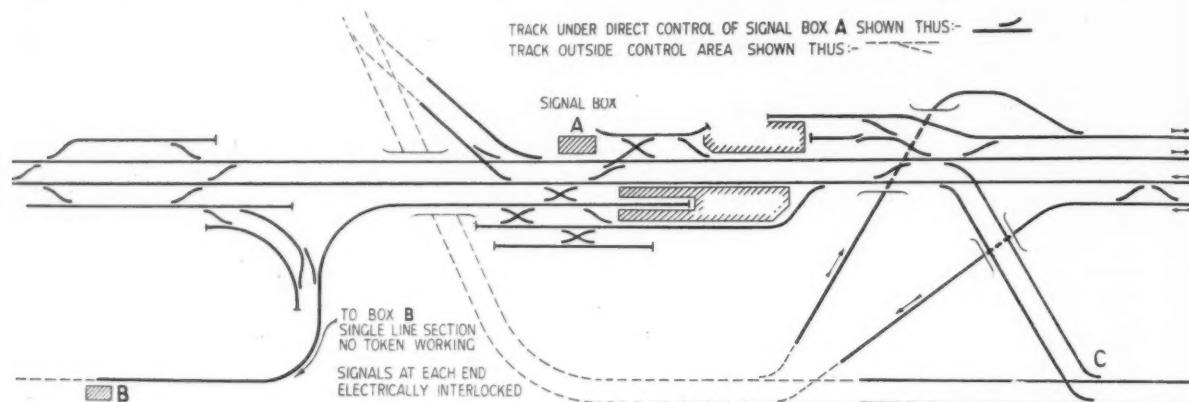


Fig. 4—Junction layout controlled by route-relay interlocking

being brought under the control of one man than would otherwise be possible. Operational convenience is not the only criterion by which a control machine should be judged. The relative cost and complexity of the electrical apparatus, the amount of maintenance required, the facilities available for training linesmen and others in the handling of the new equipment, are factors that need as careful consideration as does the major decision as to whether a power frame or a control panel should be installed.

The relative figures may vary a little as between one layout and another, but generally a power frame will have an overall length 2½ to 3 times greater than the control panel for a relay interlocking doing the same work. To bring the discussion from the abstract to the particular, the track layout of an important main-line junction is illustrated herewith in Fig. 4, as exemplifying the kind of area in which a relay interlocking can be used to advantage. The control panel was installed primarily to facilitate the handling of main-line traffic; through trains using the avoiding line and burrowing junction come under the control of the main-line junction signal box only when passing junction C. The main-line junction marks the change from quadruple to double-track road, though the last-named is also well provided with running loops. In addition to the track mileage covered by the signals directly operated from the control panel, some considerable stretches of automatically-signalled track are included in the illuminated diagram, so that the signalman is made aware as early as pos-

made more compact, and so easier to operate. It will be realised that the mounting of the thumb-switches away from their geographical position on the track diagram marks a considerable change from previous practice with relay interlockings. The "map" of the junction, or station, becomes once again just an

signals, however, can read three ways: into the down loop; along the main line; to the branch line—that is from B to C, B to D, and B to E, and there would thus be three thumb-switches on the keyboard corresponding to location B. To set up a route only one thumb switch has to be turned, though it will be appre-

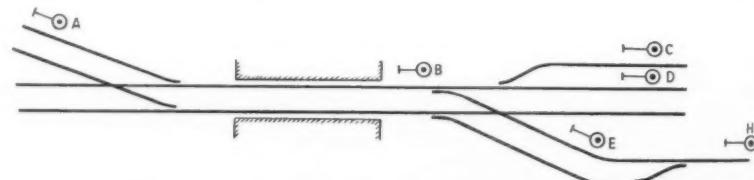


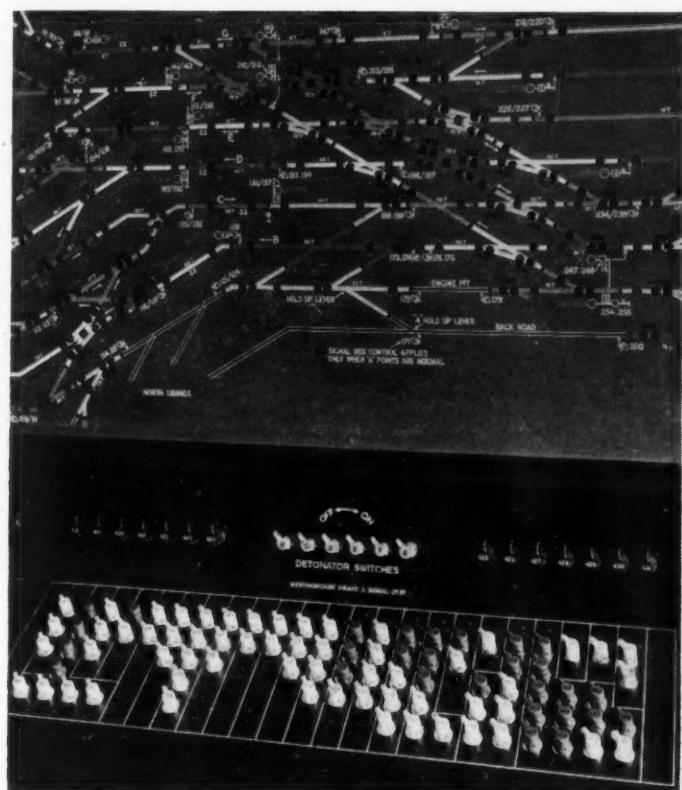
Fig. 5—Diagram illustrating route setting principles

illuminated diagram as used with an ordinary power frame, though on a very much smaller scale; indeed, the only limit to reduction still further in size is the number of indication lights required. In any control machine using non-interlocked thumb-switches, it is very important for the signalman to be advised immediately if any of the apparatus concerned in the setting-up of a route fails to function. In the system now under discussion, when a thumb-switch has been operated, and the various points and the signal reading over them have responded, a series of white lights on the track diagram are illuminated and indicate the route which has been set up. On the sloping keyboard below the track diagram the route switches relating to any particular

associated that to signal a train through the entire interlocking, for example from A to H would require the operation of three thumb-switches, for the routes A-B, B-E, and E-H.

Returning to the actual junction shown in Fig. 4, 58 signals and 33 pairs of points are operated from the control machine, although layout is such that no less than 129 routes are involved. There would thus have been considerably fewer thumb-switches if the individual system of working had been adopted. On the other hand, the number of movements made by the signalman are less; many of the routes in the neighbourhood of the station include three pairs of points, and to set up such a route under individual working, and clear the appropriate signal,

\* Part I appeared in our May 18 issue



Portion of Westinghouse route-relay interlocking control panel showing the keyboard below the illuminated diagram

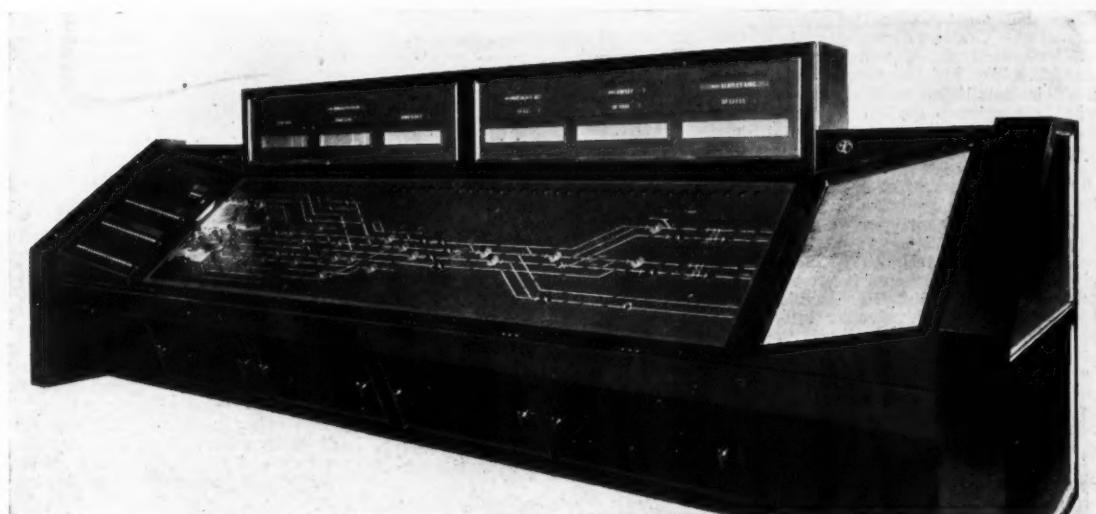
would entail operating four thumb-switches instead of one on the route system. The area included on the track diagram covers a distance of no less than 13½ miles on the main line alone; there are in addition the connections to the intersecting route on which through trains avoid the main interlocking altogether; lastly there is a single-line branch. The most distant points operated from the control machine are 2 miles to the

north of the signal box; beyond this there is a 5½-mile stretch of automatic signalling before the next interlocking is reached. On the southbound line all the track circuits on this automatic section are indicated on the control machine diagram, so that the signalman receives the first notice of the approach of a southbound train when it is still 7½ miles away; thereafter he can see its exact whereabouts by reference to the illu-

minated diagram. Such advance information assists in the smooth regulation of traffic through the junction area, as giving to an experienced man an accurate measure of the time available for the completion of shunting or other conflicting movements, or to indicate the most suitable place for side-tracking the train itself in order, maybe, to make way for a faster following train.

This extensive interlocking provides a good basis on which to compare the operating procedure that is necessary with the entrance-exit type of route relay interlocking, of which the "NX" system manufactured by the General Railway Signal Co. Ltd. is an example. At the time of writing the only installation of this system in service in Great Britain is that at Brunswick, Cheshire Lines, referred to in the first article of this series; a large installation is however under construction for the London & North Eastern Railway, and the system has been used for the resignalling of Johannesburg station, South African Railways. In the entrance-exit system two actions by the signalman are required to set up a route, the operation of a switch or knob at the entrance end, and the operation of another appliance at the exit end. Whereas in the Westinghouse system as at present installed a route never extends farther than from one signal to the next, with the entrance-exit system it is possible by operating one entrance switch and operating one exit button to set up a route from end to end of an interlocking; thus referring to Fig. 5 a route could be set up from A to H. To provide for varying traffic conditions all the immediate stages can be set up separately, so that a route could be set up from A to B, or from A to E if required.

The increased facilities for operation afforded by the entrance-exit system must however be weighed up against other factors. The entrance switches and exit buttons are located on the illuminated diagram, on the tracks themselves, and in a larger interlocking where many shunt movements have to be signalled the accommodation of these switches and buttons may very likely prove to be the governing factor, in the size of the control machine itself, or at any rate of the illuminated diagram portion. It is



Sequence switch interlocking panel combined with train description equipment

also very important to take into account the purely technical features of the apparatus. The art of railway signal engineering has now reached a stage when it can provide almost any operational feature that the Traffic Department of a railway may desire; some modern features however require more complicated circuits than others, and the question is not only one of first cost. The installation of a modern relay interlocking makes it imperative to train a maintenance staff of adequate skill. The track layouts of junction and terminal stations vary so much (and even where layouts are similar the traffic flow is different) that it is impossible to say whether one system or another is generally more suitable. It is natural that an administration reaping successful results from the adoption of one particular system should use it again in further installations. This has been the case in the North Eastern Area of the L.N.E.R., after the first use of the Westinghouse route-relay system at Hull; but for the war an enormous route-relay interlocking on the same principle would have been in service at York, having no less than 825 routes. On the other hand the Southern Area of the L.N.E.R., when work delayed by the war is completed, will have major examples of all three forms of route-relay interlocking using non-interlocked switches and push buttons.

With only one signalman controlling the operation of traffic in so extensive an area as that illustrated in Fig. 4, it is clear that everything possible must be done to relieve him of manual work, so that his whole attention can be given to the watching and arranging of train movements. In such circumstances it may well pay to include labour-saving devices, even though it is difficult to give a quantitative value to the increased efficiency secured. The ideal would appear to be to have every switch, and every operating button, within reach of a man seated in a revolving chair. The control panel at Thirsk, built in three sections, with the two outer sections inclined at 135 deg. to the centre one, was constructed somewhat on these lines, though when instruments of the magnitude of that for York come to be considered the ideal is scarcely practicable. The York control panel will consist of four bays each about 10 ft. long, and is designed for operation by three signalmen. It is intended, however, that these men shall work under the general instructions of a Traffic Controller, and it is the latter official who will shoulder the main responsibility for the regulation of traffic. This installation at York will be somewhat exceptional, and it is rather the class of layout illustrated in Fig. 4 that provides the main basis for discussion.

So far as actual systems of interlocking go there remains to be described the rotary sequence switch type, manufactured by Standard Telephones & Cables Limited. From the technical point of view this represents a bold and far greater departure from established signalling practice than any system of relay interlocking hitherto considered. From the signalman's point of view, it is in some ways a combination of the Westinghouse and entrance-exit principle; there is only one switch to be operated to set up a route, and these route switches are located on the illuminated track diagram. Where there is a number of alternative routes that can be set up, selection is obtained by turning the switch through different angles to set up different routes; when the switch has been turned to the desired angle setting up of the route is initiated

by pressing a button incorporated in the switch itself.

The interlocking controls are accomplished through the agency of rotary sequence switches of the type used in automatic telephone working. A group of "routes" through the station or junction layout which conflict with one another in the movements of traffic, and which therefore require to have their controls interlocked, are allocated to a sequence switch, and the control for any particular route is set up by the rotation of the switch to a pre-determined angle. As the fingers on the rotating portion of the switch can be in only one place at a time, no other route controlled by the switch can be set up simultaneously, and the interlocking is thereby obtained. Two signal boxes at Doncaster are being equipped with this system of interlocking.

In this discussion concerning the equipment of a large modern interlocking, little has been written so far about the conventional power frame, which for a particular layout is definitely cheaper in first cost than any system of relay interlocking yet invented. The general theme of these articles is a study of the means for securing better regulation of traffic. It would seem axiomatic that better co-ordination of train movements in a busy area is to be secured by the concentration of control in one signal box, instead of two, three, or four; and if the manual work can be so reduced as to enable one man not only to direct, but also personally to signal all train movements in such an area, an arrangement approaching the ideal surely has been attained. From a technical point of view the area controlled from one signal box can be extended indefinitely; the limiting factor is now the capabilities of the signalman himself. With a layout such as that illustrated in Fig. 4, it is quite possible that four express trains, two northbound and two southbound, and all travelling at between 60 and 70 m.p.h. may be on the illuminated diagram simultaneously, while shunting on the up side needs attention and a goods from the single-line branch requires signalling round the spur leading to the down-side running loop. Such circumstances may be exceptional, but they provide a forcible illustration of the peak-load that may be experienced on a control machine covering so extensive an area.

Although no difficulties have been experienced in the handling of such control machines it is clearly desirable to relieve the signalman of all but the most essential tasks, and there is now nothing to prevent the diagram, and the keyboard portion of a control machine being built as separate units, with the diagram once again mounted on the wall of the control room. Furthermore, by making use of modern methods of electrical selection there is no need to have a separate switch for each route. So far as the operating room of the signal box is concerned the control unit can be reduced to no more than a small desk having, for example, a row of ten push buttons. The various routes are in any case numbered, and selection would be made simply by depressing, in the correct order, the buttons having numbers corresponding with the digits of the route required. Alternatively, the number of the route could be dialled on a single instrument, as in automatic telephony. In either case the extent of the route set up would be indicated on the illuminated track diagram.

Where traffic is not ordinarily so heavy it may be found advantageous to extend the controlled area still further, and incorporate the next interlocking, which may

be a small junction or a wayside station with lengthy running loops. Were such an addition to be made to the layout shown in Fig. 4 the distance from the signal box of the outlying units would make the first cost of the cable so high, and result in so large a voltage drop on the line as to render control of the distant points and signals by direct wire impracticable. It is in such cases that the C.T.C. principle is so valuable, since by this system the whole of a distant interlocking can be controlled from the central signal box on no more than two wires. In Great Britain C.T.C. has come to be associated mainly with the signalling of long stretches of single-track railway in the Middle West and Western States of the U.S.A., where vastly improved operating has resulted from the elimination of written train orders, and from the Despatcher having in front of him an illuminated diagram of, maybe, an entire sub-division; with the whereabouts of every train clearly indicated a smooth flow of traffic can be readily arranged. But C.T.C. is not only applicable to the sparsely-used tracks of the U.S.A.; in the next article of this series its possible application to a typically busy section of British main line will be discussed.

(To be continued)

**COACHES FOR FRANCE.**—The Ministry of War Transport recently demanded twelve 15-coach trains for use in France in connection with important troop movements. The L.M.S.R. were called upon to supply five of these trains, totalling 75 vehicles. These had to be reconditioned for running long distances and were fitted with appliances to secure them to the decks of the train ferry. The first train of 15 coaches was selected, overhauled and despatched within six days and the whole of the 75 coaches had gone in 13 days.

**PLASTICS FOR THE INDUSTRIAL CHEMIST.**—One of the earliest cast phenolic plastics to be made commercially, Lorival "A," has been supplied for some years past in the form of rods and sheet for the machining of small components and has been cast into suitable shapes for a variety of uses. As an example, many thousands of Lorival "A" buckets are in use for the manufacture of chemicals, tanning, electro-plating and other industries in which corrosive liquids are employed. The standard industrial bucket is of 2-gal. capacity. The heat-resisting properties combined with the chemical resistance of this plastic make it eminently suitable for acids even at high temperatures.

**RAILWAY BYE-LAW PROSECUTIONS IN VICTORIA.**—Vigilance on the part of the checking staff of the Victorian Government Railways resulted on 2,536 passengers being prosecuted during 1944 for travelling without tickets. Some 850 passengers were found travelling first class on second class tickets, and many left the court which they subsequently attended lighter in pocket. Special attention has been given to the growing offences of entering or leaving stations by unauthorised ways, crossing or walking along railway lines, and stepping from trains in platforms into adjoining trains. The Railway Department is insisting that smokers should smoke only in compartments set apart for that purpose. Over 300 passengers, during 1944, who chose to think otherwise were reminded by fines that the railway bye-laws have to be respected.

## Electric-Lighting Equipment on L.N.E.R. Locomotives

*An axle-driven generator supplies power for head lamps and cab lighting*

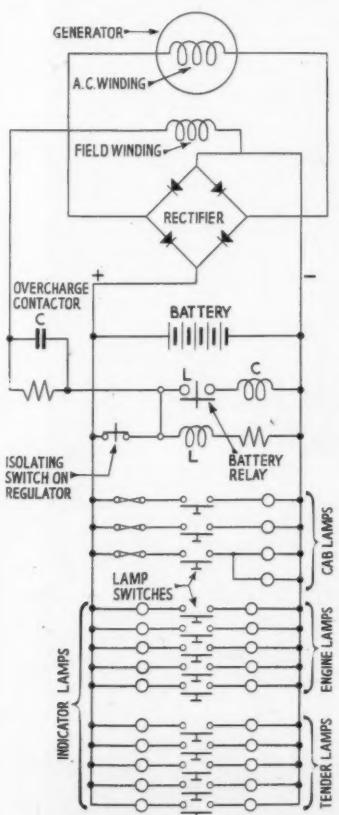
DETAILS are now available of the experimental electric-lighting equipment, briefly referred to in our issue of March 9 (page 259), which the L.N.E.R. has evolved in conjunction with the Metropolitan Vickers Electrical Co. Ltd., and is fitting to four "A 2/1" class Pacific locomotives. The equipment is designed to overcome some of the disadvantages of oil-burning head lamps, and to provide engine crews with adequate lighting for gauges and controls in the cab.

Electric power is supplied by an axle-driven generator mounted on an extension screwed and welded to the end of the trailing axle of the leading bogie. The generator is, as nearly as possible, totally enclosed and the driving torque is countered by a torque-rod carried by a bracket on the bogie frame. Connection from the generator to a terminal box on the main frame is by flexible cable, to accommodate side-play of the bogie. The generator is provided with two windings: one supplies alternating current at 6 volts for the power circuit, the other is a field winding which is separately energised from a battery placed in a cabinet beneath the fireman's seat in the cab. The battery is a 5-cell Nife unit of 35 amp. hr. capacity, and is charged by the generator through a rectifier. On starting, the generator field is energised from the battery, and as soon as the engine speed reaches 10 m.p.h. suffi-

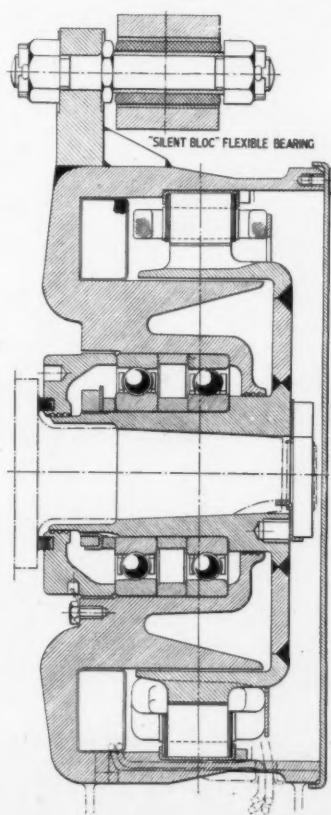
cient voltage is generated to provide current for the main circuit and for charging the battery. The supply from the generator is maintained at constant voltage. When the engine is stationary, current for the lamps is supplied by the battery.



Class "A 2/1" 4-6-2 No. 3698 locomotive as fitted in 1945 with electric head and tail lights and hinged discs



Left—Wiring diagram. Right—Section of generator mounted on the locomotive bogie axle



To avoid overcharging the battery during long continuous runs, a relay comes into operation when the voltage rises to 1.75 volts per cell. The relay causes a normally closed contactor to open and a resistance is put in series with the generator field. When the engine is stationary the battery is isolated from the generator field by a mechanically-operated switch controlled by the steam-regulator handle.

To avoid the plugging-in of loose connections when variation in the number and disposition of head lamps is required, a complement of electric lamps is fitted permanently both on the front of the engine and at the back of the tender. These lamps are small and are painted black to render them inconspicuous. The daylight traffic-indicators are hinged white discs. A control panel is fitted to the left-hand side of the cab roof. The face of the panel shows, in the form of a diagram, the front part of the engine and the back of the tender. Pilot lights on the diagram indicate which lamps are in use.

(See illustrations, page 546).

ARGENTINE TRANSANDINE HOLDINGS LIMITED.—Formal notice is now given that the whole of the £368,133 four per cent. "B" debenture stock of Argentine Transandine Holdings Limited will be redeemed at par on July 1 next. In consequence of the intention expressed by the Argentine Governments to redeem the whole of the company's holding of Argentine 4 per cent. sterling State Railway bonds, the directors had announced in November last that it would repay the £233,453 of its "A" 4 per cent. debenture stock at par on January 1, 1945, and the "B" stock on July 1, 1945. The company was formed in 1939 to acquire the remaining undertaking of the Argentine Transandine Railway Co. Ltd. after sale of the railway, lands and works to the Argentine Government.

### Electric-Lighting Equipment on L.N.E.R. Locomotives

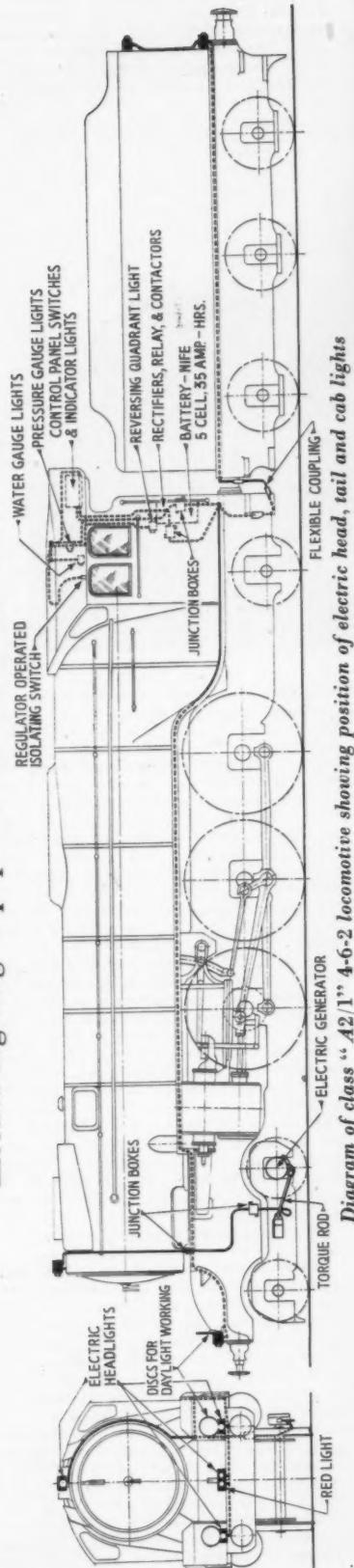
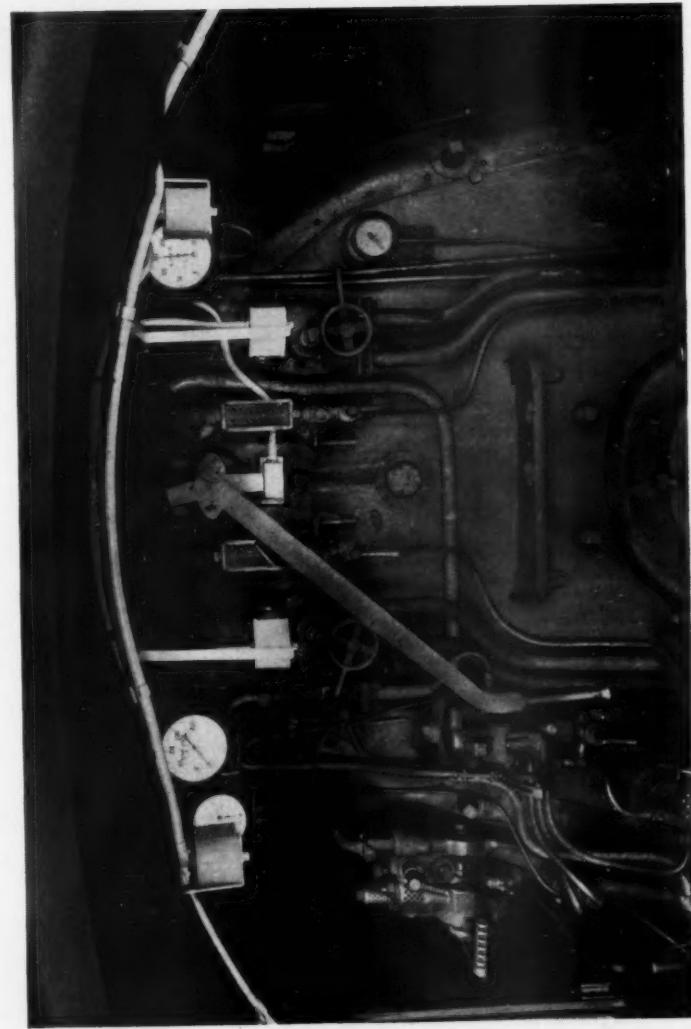


Diagram of class "A2/1" 4-6-2 locomotive showing position of electric head, tail and cab lights



Cab of locomotive fitted with electric head and tail lights, showing cab lights and isolating switch (see article, page 545)

*Under side of locomotive cab roof showing control panel for the electric lighting system*

## RAILWAY NEWS SECTION

## PERSONAL

## CHAIRMAN'S VICTORY IN EUROPE LUNCHEON TO SOUTHERN RAILWAY OFFICERS

The Chairman of the Southern Railway (Colonel E. Gore Browne) and the Deputy Chairman (the Earl of Radnor) gave a lunch to the General Manager (Sir Eustace Missenden) and the Chief and Divisional Officers of the Railway at the Charing Cross Hotel on May 28 to mark the victory over Germany and the great part which all departments played in the struggle.

The Chairman in proposing the toast of the General Manager, his officers and staff, summarised the work of the railway during the war and made special reference to the hope that those present at the luncheon would pass on the thanks of the Board to all the members of their staff for their devotion to duty under enemy bombardment and wartime difficulties, which had been such a valuable factor in winning the war. Colonel Gore Browne coupled the toast with the name of the General Manager, Sir Eustace Missenden, whose exceptional leadership had produced a team of officers and staff which he felt were second to none.

Sir Eustace Missenden, in replying to the toast, thanked the Chairman for entertaining them and for his kind remarks which would be conveyed to the whole of the line; the goodwill to be found on the Southern would stand them in good stead in facing the post-war problems.

## GOVERNMENT APPOINTMENTS

In the new Government formed by Mr. Churchill, Captain George Edward Peter Thorneycroft has succeeded Mr. Philip J. Noel-Baker as Parliamentary Secretary to the Ministry of War Transport.

Lord Leathers remains Minister of War Transport.

Sir Walter Monckton, K.C., has been appointed Solicitor-General.

Mr. C. A. Proctor has resigned his position as Joint Managing Director of the Dunlop Rubber Co. Ltd.

## PRAISE FOR A P.R.O.—ex G.W.R.

Among references to Major C. S. Lock which appear in Mr. John Gunther's book, "D Day," are the following:—

"Lock is, I believe, from the West of England; he is an experienced Public Relations man, alert, lean, indefatigable. I never met a P.R.O. with such initiative, such scrupulous standards, who would go out and fight for you no matter what the orders were."

"Lock's zeal and efficiency, even though almost everybody has been ill, are as notable as ever."

Major Lock before the war was employed in the Press Section of the Publicity Department of the Great Western Railway.

Mr. C. G. Heywood has been elected Chairman for 1945 of Pinchin, Johnson & Co. Ltd.

Mr. Alfred Raworth, M.Inst.C.E., who, as recorded in our May 4 issue, has retired from the position of Chief Electrical Engineer to the Southern Railway, but is to act as Consulting Electrical Engineer to the company for twelve months, is a son of the late Mr. John S. Raworth, who was one of the pioneers of the electrical industry of this country. After having been educated at St. Aubyn's, Lowestoft, and Dulwich College, Mr. Alfred Raworth served

mittee on Suburban Traffic Operation. After the amalgamation, Mr. Raworth was responsible to Sir Herbert Walker for the whole of the electrification of the Eastern Section suburban lines of the Southern Railway. From December, 1922, to June, 1925, he also acted as Engineer to the South Eastern & Chatham Construction & Power Co. Ltd. In July, 1925, he was appointed Electrical Engineer for New Works to the Southern Railway, which position he held until his appointment as Chief Electrical Engineer on October 1, 1938. Further reference to Mr. Raworth's work is made in an editorial article on another page.

Sir George E. Bailey, a Vice-Chairman of Associated Electrical Industries Limited, has been appointed Managing Director. Sir George Bailey is Chairman of the Metropolitan-Vickers Electrical Co. Ltd., and a Director of the British Thomson-Houston Co. Ltd.

We regret to record the death last March of Mr. Louis Esselen, a member of the South African Railways & Harbours Board since 1941. Mr. Esselen was probably one of the best-known men in the Union. He served with General Botha during the South African War, and when the provinces of the Union were granted self-government in 1907 he was General Botha's right-hand man. When Union was established in 1910, he became chief organiser of the political following led by General Smuts. He resigned from the position of General Secretary to the United Party on his appointment as a Railway Commissioner in 1941.

We regret to record the death in Cape Town on May 15 of Colonel Charles H. Hamilton, O.B.E., Director of Ports & Shipping for the Cape. Colonel Hamilton had been Chairman of the South African Railways & Harbours Service Commission until his secondment to the post of Director of Ports & Shipping for the Cape.

The Crown Agents for the Colonies have made the following first class appointments:—

Mr. R. J. Gammon to be Assistant to Controller of Road Transport, Sierra Leone.

Mr. F. B. Clark to be Assistant Mechanical Engineer, Tanganyika Government Railways.

Mr. A. Towle to be Assistant Mechanical Engineer, Railways & Ports Services, Tanganyika Territory.

## INDIAN RAILWAY STAFF CHANGES

Mr. A. Mair, Financial Adviser & Chief Accounts Officer, O.T.R., has been granted leave for one year, 4½ months, preparatory to retirement, as from December 22 last.

Mr. K. P. Velu Pillai has been appointed to officiate as Deputy General Manager, Road Transport, S.I.R., as from January 5.

Mr. Sidney Smith has been appointed to officiate as Chief Commercial Superintendent, S.I.R., as from January 8.

Mr. J. T. Hendry has been appointed to officiate as Deputy Chief Engineer, S.I.R.



Photo]

[Lafayette

Mr. Alfred Raworth

Chief Electrical Engineer,  
Southern Railway, 1938-45

an apprenticeship with Browett, Lindley & Co. Ltd., of Patricroft, Manchester, and the Brush Electrical Engineering Co. Ltd., Loughborough. From 1903 to 1912 he acted as assistant to his father. In the latter year he was appointed Chief Assistant to the Electrical Engineer of the L.S.W.R. In that capacity he was engaged to assist in the preparation of a report to the directors of the company on electrification of a large section of its suburban system, and subsequently to assist in carrying out the work. In October, 1915, Mr. Raworth joined the Royal Naval Air Service, and was commissioned as Lieutenant, R.N.V.R. In March, 1918, he was appointed Electrical Engineer to the S.E.C.R., and in December of the same year visited the U.S.A. to study electrification developments. In September, 1919, he reported on electrification of the S.E.C.R. suburban lines; in 1920 he gave evidence for the S.E.C.R. before the Electrification of Railways Advisory Committee, and in the same year was appointed Chairman of the General Managers' Com-

## Movements & Transportation Division, Headquarters, South East Asia Command



*A group of members of the Movements & Transportation Division, Headquarters, South East Asia Command, on the occasion of the recent visit there of Major-General D. J. McMullen, Director of Transportation, War Office*

*Back row:* Lance-Corporal P. Nunnerley, clerk ; Sergeant E. Surtees, clerk ; Major W. S. Badger, D.A.D. Tn. ; Major J. Davis, D.A.Q.M.G. (M) (A. H. Bull Steamship Company) ; Major I. B. Trevor, M.C., D.A.D. Tn. (Traffic Manager, Kowloon-Canton Railway) ; Major W. Sorensen, D.A.Q.M.G. (M) (Assistant Traffic Manager, Eastern Seaboard) ; Montgomery Ward & Co. ; Captain G. Carlson, D.A.D. Tn. (Southern Pacific Lines, U.S.A.) ; Lt.-Colonel N. S. Cowan, A.Q.M.G. (M) (R.E.) ; Captain T. Kite, Staff Captain Tn. (Great Western Railway) ; Major W. F. Henninger, D.A.D. Tn. (Chicago, Burlington & Quincy Railroad) ; Corporal H. Chittenden, clerk (Southern Railway) ; Corporal T. E. Little, clerk (L.M.S.R.) ; Corporal Hallewell, clerk (Union-Castle Line) ; Sergeant (R.A.F.) Lawley, clerk ; Gunner Upperdine (R.A.F.) ; Lt.-Colonel E. E. Kunze, A.D. Tn. ; Brigadier R. Montague Jones, C.B.E., D.Q.M.G. (Mov. & Tn.) ; Lt.-Colonel (R.E., Tn.) ; Brigadier J. C. B. Wakeford, D. Tn., H.Q., Allied Land Forces, South East Asia (R.E., Tn.) ; Major-General D. J. McMullen, C.B.C.E., D.S.O., D.Tn., War Office (R.E., Tn.) ; Brigadier R. Gardiner, O.B.E., D.Tn., G.H.Q. (I) (R.E., Tn.) and East Indian Railway) ; Colonel A. Bull, O.B.E., Mov. & Tn. (London Passenger Transport Board) ; Lt.-Colonel R. Grant, A.D. Tn., War Office (R.E., Tn.)

*Centre row:* Lt.-Colonel D. C. Merry, A.D. Tn. (R.E., Tn.) ; Lt.-Colonel (R.E., Tn.) ; Brigadier J. C. B. Wakeford, D. Tn., H.Q., Allied Land Forces, South East Asia (R.E., Tn.) ; Major-General D. J. McMullen, C.B.C.E., D.S.O., D.Tn., War Office (R.E., Tn.) ; Brigadier R. Gardiner, O.B.E., D.Tn., G.H.Q. (I) (R.E., Tn.) and East Indian Railway) ; Colonel A. Bull, O.B.E., Mov. & Tn. (London Passenger Transport Board) ; Lt.-Colonel R. Grant, A.D. Tn., War Office (R.E., Tn.)

*Front row:* Sergeant C. Boswell, clerk ; Wren M. Roberts, stenographer ; Sergeant (W.A.C.) H. D. Jenkins, stenographer ; Quartermaster-Sergeant H. Wilkinson, chief clerk ; Wren J. P. Shaw, stenographer ; Staff-Sergeant (W.A.C.) B. J. Oler, stenographer ; Lance-Corporal C. Evans, draughtsman. The present appointment of each of the above is at Headquarters, Supreme Allied Command, South East Asia, unless otherwise stated. Additional references are to pre-war transport appointments

## TRANSPORT SERVICES AND THE WAR—296

## G.W.R. Government Specials

From the outbreak of war in 1939 to VE Day, the G.W.R. ran 103,898 Government specials, carrying 10,454,778 men and more than 15,000,000 tons of stores and equipment.

## Buses for Repatriation

The Government has requisitioned a number of motorbuses for service in the repatriation of European populations from Germany to their homes. Some of these have come from railway-associated fleets. For example, ten single-deck vehicles have been supplied by the West Yorkshire Road Car Co. Ltd.

## Removing Protective Netting

Good progress is being made with removing the protective netting from the windows of London Transport trains, buses, trams, and trolleybuses. The adhesive, a special heavy-bodied varnish, is difficult to remove. A liquid remover might damage surrounding paint, so, after the fabric has been taken off with a stripping knife, razor blades are used to complete the operation. Netting had to be removed from 381,591 windows. During the war a total of 549,122 sq. yd. of netting was used by the London Passenger Transport Board.

## Reichsbahn Vessels on Lake Constance

The nine Reichsbahn vessels and train ferries on Lake Constance, which had been concentrated at Lindau (Württemberg), were transferred to Swiss ports during the night of April 25-26, to avoid their being scuttled by fanatical Nazi elements. This transfer is officially stated by Swiss sources to have been effected in accordance with an agreement previously concluded between the Swiss and German authorities, with the understanding that the vessels were to return to their German bases as soon as the whole German shore of the lake was occupied by the Allies. It is stated that the original intention was to scuttle the vessels as soon as the Allies approached Lindau and Bregenz, but that the Reichsbahn opposed this and was successful in arranging the temporary transfer of the fleet to Swiss ports.

The largest train ferry, the *Deutschland*, which is also the biggest vessel on Lake Constance, made her way by her own power from Lindau to Romanshorn. According to her log book, the vessel has been out of commission since the end of 1939. The other vessels were towed to safety by motor boats. The *Allgäu*, *Ostmark*, *Vorarlberg*, and *Stadt Bregenz* went to Romanshorn, and the *München*, *Lindau*, and *Ravensburg* found refuge at Arbon. As soon as the German-Swiss border line across the lake was reached, the German crews left the vessels and returned to Germany by means of motor boats, and the vessels (fully lighted on the Swiss side of the lake) continued their course in charge of Swiss crews. The *Stadt Bregenz* and *Vorarlberg* belonged to the Austrian Federal Railways and were "taken over" after the incorporation of Austria into the Reich in 1938.

Before the war the German Reichsbahn operated six lines across the lake and along its northern shore; the longest was between Bregenz and Constance, *via* Lindau and Friedrichshafen (36 miles). Ferry services were maintained in connection with the most important trains between Friedrichshafen and Romanshorn (12 services a day in each direction in the summer months); Friedrichshafen and

Rorschach (5 services a day in each direction during the summer); Lindau and Romanshorn (3 services); and Lindau and Rorschach (5 services). The Swiss ferry services were discontinued in 1938.

## Moscow—Berlin Railway

It was announced in Moscow on May 27 that through railway communication had been established between Moscow and Berlin. The break of gauge from the Russian 5 ft. to the European standard 4 ft. 8½ in. now occurs at the River Vistula.

## Heavy Traffics in Egypt

Last year the railways in Egypt continued to handle heavy traffics satisfactorily, despite their inability under war conditions to replace equipment which had been used much beyond its originally-designed limits. Goods carried by the Egyptian State Railways from May 1 to October 31, 1944, amounted to 3,300,000 metric tons, compared with 3,885,000 during the corresponding period in 1943. Passengers carried numbered 30,700,000, compared with 30,846,000 in the 1943 period. Receipts from May 1 to October 31, 1944, amounted to £E.7,384,660, compared with £E.6,963,612. Operating expenses amounted to £E.3,333,929 (£E.2,973,493 in the corresponding months of 1943), leaving net earnings of £E.4,050,731, compared with £E.3,990,119 in the 1943 period.

## War Transport in China

A War Transport Board was established on January 1 for the purpose of exercising general control over all forms of transport in Free China. The India-China or Ledo-Burma Road (named the Stilwell Road by Chiang Kai-Shek) was opened in January, and the first motor lorry convoy arrived in Kunming on January 22, but it was announced officially by both the Chinese and the American military authorities that traffic on the road for an indefinite period would be confined to military supplies.

The Chinese Ministry of Communications is planning the reconstruction of the Tuyun-Nantan section of the Kweichow-Kwangsi Railway at an estimated cost of CN\$1,200,000,000. By the end of February, all engineering work had been completed for the new 100-mile railway from Paohsi (Shensi Province) to Tienshui (Kansu Province), and 26 miles of track had been laid; it was expected that the entire line would be completed by June. Progress is also reported in the construction by the Szechuan Provincial Government of a 52-mile railway between Chungking and Chikiang (Szechuan Province).

## Goods Wagon Loadings in India

Goods wagon loadings of the Indian railways increased by 4.81 per cent. on the broad-gauge, and by 8.54 per cent. on the metre-gauge, in December, 1944, compared with December, 1943.

From April 1 to December 31, 1944, goods wagon loadings were higher by 3.3 per cent. on the broad-gauge, and 9.27 per cent. on the metre-gauge.

## "Super-Demurrage" on U.S.A. Wagons

A sliding scale of "super-demurrage" charges on wagons has once again been put into operation by the Interstate Commerce Commission of the United States, at the request of the Office of Defense Transportation, in order to enforce rapid loading and unloading, and so to help ease the acute wagon shortage of box wagons. After the expiration of "tariff free" time, demurrage charges on each bogie box wagon are fixed at \$2.20 a day for the first two days, \$5.50 for the third day, \$11.00 for the fourth day, and \$16.50 a day for each succeeding day. If the box wagons are subject to an average arrangement, the \$2.20 a day charges may be offset or reduced by accrued credits, as provided for in the tariff, but the higher charges from the third day onwards may not be offset in this way. These charges supersede the regular tariff charges for the use of box wagons to store freight at or near ports, when such freight is consigned for export, or for coastwise shipping. The scale is in force from April 1 to October 1.

## L.N.E.R. Summer Train Services

The timetables operative over the L.N.E.R. from May 7 in general follow the lines of the summer service planned for 1944, but severely curtailed in that year due to "D Day" preparations. The 9.15 a.m. from Kings Cross to Newcastle, previously Mondays, Fridays, and Saturdays, runs daily, as also the 12.25 p.m. Newcastle to London. The 9.40 a.m. from Kings Cross to Edinburgh omits the York stop, calls only at Grantham and Newcastle, and reaches Edinburgh at 6.26 p.m., 6 min. earlier. On Mondays, Fridays, and Saturdays (Fridays only until June 4) a relief express leaves Kings Cross at 3.30 p.m. for Grantham, York, Darlington, and Newcastle, and on Mondays and Fridays a corresponding relief leaves Newcastle at 7.45 a.m. for Darlington, Peterborough, and Kings Cross only, arriving at 1.36 p.m.; supplemented by a new Sunday train from Newcastle at 10.25 a.m., calling at York, Doncaster, and Peterborough and reaching London at 5.5 p.m. The 11 a.m. on Sundays from Kings Cross to Edinburgh calls at Peterborough, ceases to call at Grantham, Newark and Retford, and reaches Edinburgh 9 min. earlier, at 8.9 p.m.; also on Sundays the 10.10 a.m. express to Leeds leaves at 9.55 a.m., and the 10.50 a.m. to Edinburgh at 10.45 a.m. There is a new Sunday train from Kings

Cross to Peterborough at 6.45 p.m., and an additional express to Newcastle at 11.30 p.m. On the Great Eastern Section important additions to the train service were made on February 5, as recorded in the February 9 issue of *The Railway Gazette*; a further change from May 7 is a new train from Liverpool Street at 10.30 a.m. to Ipswich, calling at principal stations, and relieving the 10 a.m. down of the Clacton and Walton branch traffic. On Sundays there is a relief express from Liverpool Street at 9.50 a.m. to Norwich, calling only at Chelmsford, Colchester, Ipswich, and Diss, and reaching Norwich at 1 p.m., 75 min. ahead of the previous 10 a.m. down. The 4.32 p.m. and 4.40 p.m. expresses from Liverpool Street to Bury St. Edmunds and Hunstanton change places; the 3.35 p.m. from Bury on Sundays runs through non-stop from Cambridge to Liverpool Street, arriving 25 min. earlier. Numerous alterations are made in the London suburban district, including new trains at 8.46 a.m. from Liverpool Street to Southend, 7.39 p.m. from Southend to Liverpool Street, and 12.21 p.m. (Saturdays only) to Hertford East. The 6 p.m. from Marylebone to Brackley now starts 15 min. later, and is non-stop to Ruislip, so being accelerated 15 min.

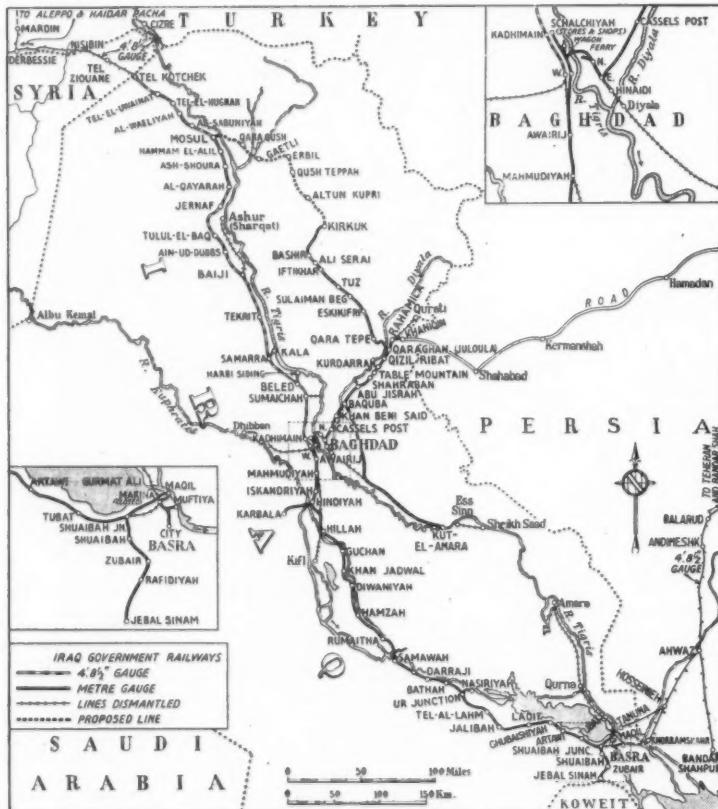
## Another Aid-to-Russia Route

*A brief description of the railway system in Iraq, which, with the inland waterways, has been sharing the burden of a considerable volume of Persian Gulf-Russian traffic*

Soon after the 1941 troubles in Iraq, led by Rashid Ali, the railways and inland waterways of that country became another important supply line for "aid to Russia." Their control was taken over by a mixed Indian and Royal Engineer organisation, with a Transportation Directorate in Baghdad, very similar to the one in Teheran, already described in our issue of February 2, 1945, in the article entitled "British work on Persian Railways, 1942."

It may be remembered that the railways in Iraq are of two gauges, standard and metre. The former as eventually

branch to Khanqin near the Persian frontier. A road runs from Khanqin via Kermanshah, Hamadan, and Kazvin to Resht on the Caspian Sea. Virtually all the metre-gauge lines were built during 1915-20. At the present time, therefore, there are 328 miles of standard gauge lines and 638 miles of metre-gauge in the country. A scheme, fostered by Sir John Ward, the then Director-General of Railways in Iraq, was afoot to run a through passenger service from Calais to Basra by means of a train-ferry across the Bosphorus, and after the conversion of the Basra-Baghdad line from metre to



*The railways of Iraq and neighbouring territories*

completed on July 15, 1940, is a part of the Kaiser's pre-1914 Baghdad Railway,\* and runs from Tel Kotchek on the Syrian frontier via Mosul to Baghdad. The famous Taurus Express from Haidar Pacha, on the Bosphorus, to Baghdad ran over this section in peacetime. The metre-gauge system consisted before the war of (a) the main line from Basra, the premier Persian Gulf port, situated on the Shatt-el-Arab, to Baghdad, with branches to Jebel Sinam, Nasiriyah, and Karbala. It is connected by a wagon-ferry over the Tigris at Baghdad with (b) the Baghdad-Kirkuk section, with a

standard gauge. A service of fast steamers was proposed from Basra to Karachi in extension of this through-rail service.

When the Military Directorate assumed charge in 1941, the metre-gauge equipment consisted of standard locomotives and rolling-stock sent over from all the Indian metre-gauge railways during the last war. Though generally standardised, these differed in detail. The locomotives were all oil burning. Many different sections of rail were in use in the permanent way.

The 4-ft. 8 1/2-in. gauge section is laid with 75-lb. B.S. rails. The locomotive stock consisted (a) of what remained of the old German engines that had been in

\* The section from Baghdad to Samarra was actually in operation under German auspices and with German equipment in 1914.

service before 1914 on the Baghdad-Samarra section, (b) three streamline Pacifics built specially for the Taurus Express service by Stephenson & Hawthorn and delivered after the outbreak of the 1939-45 war, and (c) a number of American 2-8-2s similar to those sent over to the Persian Railways, and described in the article previously referred to on that subject. The standard-gauge wagon stock was British, Indian, and American-built. Apart from excessive heat in their cabs and one or two minor defects, the Pacifics appear to be very satisfactory engines and capable of working 400-500-ton trains at up to 60 m.p.h. on the level and at 30 m.p.h. on grades at 1 in 125, the ruling grade between Tel Kotchek and Baghdad apart from a section of 1 in 80 near Mosul. It is not yet clear whether the American 2-8-2s are only lent to the Iraq Railways or whether they will be available to that system after the war. It is possible that the U.S.A. diesel-electrics in Persia may suggest the introduction of this type of power unit in Iraq after the war, despite their high purchase cost and specialised maintenance.

It must not be forgotten that the railways in Iraq shared with the inland waterways' Tigris steamer services the burden of the aid-to-Russia traffic. In the 1914-18 war a metre-gauge line was built from Kut-el-Amara, on that river, to Baghdad to assist in handling the river traffic, which is necessarily slow by reason of the tortuous course of the river and innumerable sandbanks. Though removed as unprofitable after that war, this line was restored during the recent war by the combined Directorate in Baghdad, but instead of running to Baghdad the new line took a short cut to Persia by striking across to Baquba on the Baghdad-Khanqin section. The Kut-Baquba line was opened for traffic in December, 1942.

Supplies for Russia arriving at Basra by steamer were, therefore, forwarded to Khanqin (a) by rail direct without break of bulk via the Baghdad wagon-ferry, (b) by river steamer to Kut-el-Amara and thence by rail, and, possibly, also (c) by steamer to Baghdad and onwards by rail. No figures of the tonnages handled are available at the moment.

### SOUTH AFRICAN RAILWAY BOOKSTALLS.

It is stated in the *Bulletin* for April last of the General Manager of the South African Railways & Harbours that railway bookstalls have been directly instrumental in stimulating the purchase by the public of South African books and periodicals. They have become an important distributing means for the large number of publications in Afrikaans, and are functioning successfully, it is reported, not only on the larger, but on many small, stations. Their success may be measured by the revenue they produce, which for last December represented an all-time record. For the nine months ended December 31, 1944, total takings reached the new record of £322,394, an increase of £44,578 over the corresponding period of the previous year. The heavy sales took place in spite of the comparatively small numbers of new books received last year from the United Kingdom and the United States.

**AUSTERITY THIRD CLASS COACHES IN INDIA.**—A number of Australian-built underframes was received recently in India, and austerity bodies are being constructed for third class coaches for use during the war.

## Institution of Railway Signal Engineers

### New Articles of Association approved

The annual general meeting of the Institution of Railway Signal Engineers was held at the Institution of Electrical Engineers, London, on May 23, 1945. The President, Major R. Falshaw Morkill, was in the Chair.

The Hon. Secretary, Mr. L. F. Baker, having read the notice convening the meeting, the minutes of the last meeting and the Auditors' report, the President presented the annual report for 1944 and the statement of accounts. He outlined the work done by the Institution during the year, and said that its finances continued to be satisfactory. The development and other committees had done excellent work and the Thorwood Bequest continued to be satisfactorily administered. Membership had grown and with the cessation of hostilities in Europe there was increased scope for the Institution's activities. His thanks were due to his colleagues on the Council and the members generally for the support they had given to him during the session. The adoption of the report and accounts was proposed by Mr. F. L. Castle, seconded by Mr. A. Moss, and agreed to.

The President then adjourned the meeting for the purpose of holding an extraordinary general meeting, and, in opening it, proceeded to make a statement on the work done by the Development Committee which had resulted in the drawing up of new Articles of Association laid that day before the meeting for approval. He referred to their principal features and the effect they would have on the number of classes of membership, subscription rates, the composition of the Council, the rules under which its members would be elected to and retire from it, and other details, concluding by proposing, as a special resolution, that the new articles be adopted.

Mr. H. H. Dyer, Vice-President, seconding the resolution, spoke of the Council's desire to see the status and influence of the Institution increase. He thought anyone outside its ranks who might read through the new articles would have a much higher conception of the Institution than he would have obtained from a reading of the old. The introduction of examinations could not fail to improve the standing of members. They had been feeling for some time that there were certain persons who would like to enter the Institution and whom they would like to receive, but they could not do so while the articles remained unaltered. The new ones would broaden the basis of their work and enable such individuals to join them, to their mutual benefit. They had to keep in step with the times, but the new features they were introducing would cost money and a certain raising of subscription rates was therefore essential. Even then nobody could say that the new rates were other than reasonable and although they were not obligatory for existing members he could not believe that any of them would decline to conform to them. The Council knew that there was still much work to do, but counted on the support of members in carrying it out.

On a show of hands the President announced that the requisite votes for the resolution had been duly obtained and that the new Articles were therefore in force.

The annual general meeting being re-

opened, Mr. V. S. King proposed and Mr. F. Edwards seconded the re-appointment of Messrs. Gundry Cole & Company as Auditors and this was agreed to.

Mr. A. F. Bound, Past President, asked the meeting to accord a hearty vote of thanks to all those who, during a period of two years in a difficult time in the war, had worked so carefully and well at the task of drafting the new Articles. He wished particularly to refer to Mr. R. S. Griffiths, Past President, who had worked extraordinarily hard and in great detail, and the Development Committee's legal adviser, Mr. J. Griffith Hall. The President had not spared himself either. It was most gratifying to see the great interest being taken in the Institution's affairs, to which the new Articles themselves and the attendance that evening bore witness. It augured well for the future, and what had just been done would help the Institution in no uncertain manner to go forward and successfully perform the tasks that were before it.

The President feelingly acknowledged

the vote and expressed his own thanks for the support the Council had received in its work. All those concerned in the vote would greatly appreciate it. The next meeting, he said, was to be a "question and answer" one, on June 27.

Mr. H. H. Dyer said that a very large number of questions, of a most varied kind, had been received and he wished, as chairman of the Papers Committee, to thank the members for the excellent support they had given the Council in the matter.

The Council now elected under the new Articles is composed of Major R. Falshaw Morkill, President; Mr. H. H. Dyer and Mr. F. L. Castle, Vice-Presidents; Messrs. James Boot, G. H. Crook, R. S. Griffiths, H. E. Morgan and C. Carslake, Co-opted Past Presidents; Messrs. T. Austin, L. J. Boucher, E. G. Brentnall, R. Dell, T. Guest, F. Horler, P. Lomas, A. Moss, C. F. D. Venning, and A. W. Woodbridge, Members; Messrs. R. C. Batter, C. G. Derbyshire, W. J. Howes, F. Mann, N. Marshall and D. R. Turner, Associate Members.

At a Council meeting held after the general meetings Mr. L. F. Baker was elected Hon. Secretary and Mr. T. S. Lascelles, Hon. Treasurer.

## Staff and Labour Matters

### Railway Wages

A meeting was held in London on Thursday, May 17, between representatives of the Railway Executive Committee and representatives of the National Union of Railwaymen, the Associated Society of Locomotive Engineers & Firemen and the Railway Clerks' Association, when the unions stated their case in support of their claims for increases in rates of pay, based on a minimum wage of 90s. a week, and improvements in conditions of service, including a 40-hr. week.

The Railway Shopmen's National Council also met on Friday, May 18, for the same purpose in connection with the claims submitted on behalf of Railway Workshop Staff.

### Relief Signalmen

A decision by the Chairman of the Railway Staff National Tribunal recently has been issued on a claim submitted to him by the National Union of Railwaymen that time spent by relief signalmen in travelling on Sunday evening to take up duty on Monday morning should be paid for as one half day's pay at Sunday rate, irrespective of any other turn they may have performed on the Sunday concerned.

The claim was presented to the Chairman at a hearing on May 9, 1945, at which Mr. W. J. Watson represented the National Union of Railwaymen and Mr. H. J. Comber represented the railway companies.

Clause 1(c) of Railway Executive Committee Circular Letter No. 1786, dated April 3, 1919, deals with payment for Sunday duty for conciliation grades other than trainmen and is as follows:—

"SUNDAY DUTY—A man required to come on duty for one short turn on Sunday for a period not exceeding three hours shall be paid a minimum of half a day's pay at Sunday rate. If the time exceeds three hours or if a man is required to book on twice for two turns of duty on Sunday, he shall be paid for all time worked (with a minimum of eight hours) at the Sunday rate."

Clause 27 of the first memorandum on

points of interpretation arising out of the agreements relating to conditions of service of railway employees, dated December 21, 1920, is as follows:—

"PAYMENT OF DISTRICT RELIEF SIGNALMEN FOR TRAVELLING TIME ON SUNDAYS—In cases where district relief signalmen are required to travel to a certain point on Sunday evening to take up duty at that place early on Monday morning, one half day's pay at Sunday rate should be allowed for the travelling time on Sunday, *vide* clause 1(c) of circular letter No. 1786."

It was contended by the National Union of Railwaymen that district relief signalmen who, in the normal way, are the only grade expected to travel out on Sunday evening in readiness to take up duty at a particular place early on Monday morning, are in a different position from other conciliation grades who perform Sunday duty, as such other grades, when they have completed their rostered duty, are free for the remainder of the day or evening as the case may be; that clause 27 of the first memorandum on points of interpretation definitely prescribes the method of payment of district relief signalmen for travelling time on Sundays irrespective of whether the time travelling out is undertaken after the completion of Sunday duty at a particular place or is the first booking for the day; that it is not within the spirit and intention of clause 27 that travelling time should be linked up with a turn or turns of duty previously performed at a particular place on the Sunday; that the companies have acted irregularly in linking an actual turn of Sunday duty with travelling time for the purpose of payment; and that there is no authority contained in any agreement or decision empowering the companies so to act.

It was contended by the railway companies that the decision embodied in clause 27 of the first memorandum on points of interpretation was intended to place a relief signalman travelling on the Sunday evening in the same position as a man brought on duty for actual work on the Sunday evening; that without such a decision there was no specific provision for the signalman who spent some time in

travelling on the Sunday as distinct from working; that since this decision became operative the travelling time of relief signalmen on Sundays has been considered as time worked and paid accordingly; that it is appropriate to link an actual turn of Sunday duty with travelling time for the purpose of payment; that such linking is implied by clause 27 of the first memorandum on points of interpretation, which places travelling time on Sundays in the same category for payment as working time; and that any arrangement under which a higher payment would be made for travelling time than for the same period of working time would be anomalous.

The Chairman of the Tribunal finds against the claim.

## Questions in Parliament

### Acquisition of Railway Land in Lebanon

Major-General Sir Edward Spears (Carlisle—C.) on May 1 asked the Secretary of State for War, on what date he asked the Lebanese Government to introduce legislation to set up machinery to enable the military authorities to pay compensation to the dispossessed owners of the land on which the Haifa-Beirut-Tripoli Railway was built; and what was the reply of the Lebanese Government to the request.

Sir James Grigg (Secretary of State for War) in a written answer stated: A decree was promulgated on October 4, 1944, by the Lebanese Government authorising the registration of the land in the name of the Secretary of State for War. Thereafter representations were made to the Lebanese Minister of Justice that an arbitration commission should be set up to settle the prices of the land but so far the Lebanese Government has not done so.

### Liverpool-Belfast Steamer Service

Major Sir Ronald Ross (Londonderry—C.) on May 16 asked the Parliamentary Secretary, Ministry of War Transport, what functions were now being performed by the ships of the pre-war Liverpool to Belfast service; and whether he could make a statement as to the resumption of that service.

Mr. P. J. Noel-Baker: Before the war, three ships were engaged on the service between Liverpool and Belfast. One of them has been sunk; one has been acquired by the Government for naval work; the third is also on Admiralty service. As soon as other suitable vessels can be released from Service requirements, the service will be restored. I regret that I am not yet able to say when this will be.

### Glasgow-Campbeltown Services

Dr. R. D. McIntyre (Motherwell—Scots Nat.) on May 16 asked the Parliamentary Secretary, Ministry of War Transport, if he would take immediate steps to see to the placing of a passenger and cargo vessel on the Glasgow-Campbeltown service.

Mr. P. J. Noel-Baker (Parliamentary Secretary, Ministry of War Transport): A cargo steamer sails from Glasgow to Campbeltown on Monday, Wednesday and Friday of each week, and returns from Campbeltown on Tuesday, Thursday and Saturday. For passengers, there is a daily air service and a bus service twice a day in each direction. Passengers also can travel by a daily steamer from Glasgow to Tarbert and from there to Campbeltown by bus. Before the war, two ships worked on this route. One of them has been sunk, the other acquired by the Admiralty for naval service. I regret that there are no suitable vessels now available to replace them.

Replying to a supplementary question by Dr. McIntyre, Mr. Noel-Baker said he regretted the service was not better, but considering that they still were working in wartime conditions and there was a great strain on shipping, he considered that the facilities both for passengers and for cargo were very good.

Mr. W. Gallacher (West Fife—Communist): Would it not be better to run a steamer from Wemyss Bay direct to Campbeltown rather than from Wemyss Bay to Tarbert with a bus service from Tarbert to Campbeltown—a very round-about way?

Mr. Noel-Baker: Of course, it would be more convenient, but many people in many parts of the country have had to put up with great inconvenience.

### Staffs Reductions

Mr. W. F. Higgs (Birmingham West—C.) on May 8 asked the Chancellor of the Exchequer what Ministries had reduced their personnel this year; and would he give the reduction figures.

The Chancellor of the Exchequer (Sir John Anderson) circulated the following reply: Taking the latest available figures for Government non-industrial staffs—namely those for January 1, 1945—and comparing them with the corresponding figures for January 1, 1944, the undermentioned departments have shown a reduction in numbers. Part-timers are included two part-timers being reckoned as the equivalent of one whole-timer. Departments with staffs of less than 2,000 are excluded.

Department	No. of staff at 1.1.44	No. of staff 1.1.45	Amount of reduction
Ministry of Supply	66,395	61,584	4,811
Ministry of Food	42,276	28,241	4,035
Ministry of Labour & National Service	39,827	37,096	2,731
Inland Revenue	37,229	36,791	438
Ministry of War Transport	15,955	14,961	994
Postal & Telegraph Censorship Department	10,702	9,861	841
Customs & Excise	9,397	9,171	226
Home Office and Ministry of Home Security	7,413	6,269	1,144
Board of Trade	6,106	6,043	63
Ministry of Fuel & Power	4,953	4,894	59
Ordnance Survey	2,004	1,887	117

### Measurements of Motor Buses

Mr. T. H. Hewlett (Manchester, Exchange—C.) on May 8 asked the President of the Board of Trade how many countries not manufacturing themselves were in the

market for motor buses; and how many specified measurements which, prevailing in this country, permitted our manufacturers to compete on equal terms with producers in other lands.

Mr. Hugh Dalton (President of the Board of Trade): At least fifteen countries, none of which manufacture themselves, are in the market for motor buses. In six of these countries the maximum legal width of vehicles is the same as in the United Kingdom.

### Severn Barrage Scheme

Mr. R. D. Denman (Leeds Central—Nat. Lab.) on April 27 asked the Minister of Fuel & Power what considerations, other than financial, were delaying decision to proceed in due course with the construction of the Severn Barrage.

Major G. Lloyd George (Minister of Fuel & Power) stated in a written answer: There are many considerations involved, including estimates of the future price of coal and availability of manpower.

Mr. Denman on April 27 also asked the Minister of Fuel & Power what would be the saving in the cost of the Severn Barrage if it were financed during the period of construction by short term borrowing at 1 per cent. per annum compound interest.

Major Lloyd George in a written answer stated: On the basis of the figures in paragraph 27 of the report on the Severn Barrage scheme I estimate that there would be a saving of approximately £3,125,000 if the construction of the Severn Barrage could be financed by short term borrowing at 1 per cent. per annum compound interest.

**GREAT INDIAN PENINSULA RAILWAY ANNUITIES.**—It is notified that in accordance with the provisions of the Great Indian Peninsula Railway Purchase Act, 1900, a total of £27,065,612 was, on May 1, 1945, invested for the purpose of providing a sinking fund in respect of the annuities Class "B." The railway was purchased on June 30, 1900, by means of an annuity of £1,335,564, equal to a capital value of £34,859,218—or £174 6s. 0d. for every £100 stock, of which £20,000,000 had been issued. There are now outstanding £242,847 of Class "A" annuities, and £1,025,669 of Class "B" annuities. Both classes of annuity will cease on August 17, 1948.

### MODERN METHODS OF WATER TREATMENT

(Concluded from page 541)

water for boilers working at pressures of 600 lb. per sq. in.; for chemical manu-

### ANALYSES IN GRAINS PER GALLON, SHOWING EFFECT OF THE TREATMENTS DESCRIBED ON A GIVEN WATER

- A. Raw water.
- B. "Spiractor" alone.
- C. "Spiractor" followed by base exchange.
- D. Precipitator lime soda.
- E. Pressure hot lime-soda.
- F. Hydrogen zeolite blended.
- G. "Deminrolit."

Type of water	A	B	C	D	E	F	G
Total hardness as $\text{CaCO}_3$	21.9	11.7	Zero	2.0	0.4	Zero	Zero
Calcium hardness as $\text{CaCO}_3$	18.7	8.5	—	1.0	0.3	—	—
Magnesium hardness as $\text{CaCO}_3$	3.2	3.2	—	1.0	0.1	—	—
Bicarbonate alkalinity as $\text{CaCO}_3$	12.2	Nil	—	Nil	Nil	—	0.7
Carbonate alkalinity as $\text{CaCO}_3$	—	2.0	2.0	4.5	4.5	Nil	Nil
Caustic alkalinity as $\text{CaCO}_3$	—	—	—	1.0	1.5	Nil	Nil
Total dissolved solids	26.0	15.8	17.0	20.3	20.9	16.0	0.9
Chloride Cl	2.0	2.0	2.0	2.0	2.0	2.0	0.1
Sulphate as $\text{SO}_4$	6.6	6.6	6.6	6.6	6.6	6.6	Trace
Approximate cost per 1,000 gallons treated	—	1.5d.	2.8d.	3.4d.	2.4d.	3.65d.	1s.

## Railway Staff Magazines in Wartime

By a Correspondent

Maintaining the continuity of the staff magazines of British Railways has been a stiff proposition in wartime. The most serious drawback proved to be the early imposition of a paper quota, and, in common with all types of home newspress and periodicals, railway companies had to consider whether it would be possible to continue publishing. Adding to their difficulties was the operation of a strict censorship, which had particular application to journals of this type owing to the tendency to refer to place names and movements, both factors being of possible value to the enemy. With printing costs steadily rising and revenue earning advertisement space drastically curtailed it seemed inevitable that modification of some kind would have to be adopted.

The L.M.S.R. dropped its usual journal and produced in its stead a wartime newspress style of publication entitled *Carry-On*. This still circulates regularly each month and its average of eight 10½ in. x 13½ in. pages contain a most interesting variety of up-to-date material. As a contrast to this large-page medium, the London Passenger Transport Board devised its 5 in. x 7 in. *Pennyfare*. By using small type a wealth of reading matter, mainly compiled for the staff serving with H.M. Forces, together with numerous photographs, was crowded into

each issue. The Southern Railway resorted to a bi-monthly publication which retained most of its pre-war features in more or less abbreviated form. This magazine resumed monthly publication in January, 1945. The G.W.R. and L.N.E.R. continued to publish on pre-war lines but, with limitation of pages as the war went on. In all cases the magazine editors continued, despite space difficulties, to preserve a lively interest, and there is much evidence of adaptability and skilful handling in attaining this objective.

One would naturally expect these conditions to have a decidedly adverse effect on sales, particularly with over 110,000 railwaymen entering the services and ceasing to be, for the time being, potential regular readers. In the case of the *L.N.E.R. Magazine*, at any rate, although a heavy drop was experienced on the outbreak of war, the position never reached the serious stage. In fact, the 1944 figures revealed a steady increase which, in the aggregate, showed a 5 per cent. improvement on the previous year. The current year records an upward tendency which must be very encouraging to the magazine managers. As to the usefulness of railway publications during the war period there can be no doubt. Staff dispersed to every war front have been able to keep in touch with affairs in the homeland; encourage-

ment by messages from the railway chiefs has been broadcast far and wide; women workers deputising for men in the services have not been overlooked, and in almost every issue one could read appreciation for the efforts of the sadly depleted and temporary staffs.

Meanwhile, it is interesting to observe the position of railway journals published overseas. These, apparently, revelled in a surplus of paper, the ban on shipping space having operated in favour of paper-producing countries. For many years the *L.N.E.R.* editor maintained an interchange of copies with the editors of overseas publications, a practice which continued throughout the war, and one can well imagine with what sympathy the meagre *L.N.E.R. Magazine* was received in New York or Calcutta during those difficult times. Still, in this country, we cherish deep satisfaction in survival, and maybe British railway journals each can take pride in both the sacrifice and the accomplishment.

## British Engineers Small Tools & Equipment Co. Ltd.

As was recorded in our May 11 issue, an organisation under the title British Engineers Small Tools & Equipment Co. Ltd. has been formed to develop the export sales of Brooke Tool Manufacturing Co. Ltd., Coventry Gauge & Tool Co. Ltd., A. A. Jones & Shipman Limited, F. Pratt & Co. Ltd., Taylor, Taylor & Hobson Limited, and E. R. Watts & Son Ltd.

A reception was held at Claridges Hotel, London, W.1 on Friday last, to inaugurate the company. Guests were welcomed by Mr. H. H. Harley, Chairman of the company, who said that Mr. Spencer Summers, who recently had been appointed Secretary of the Department of Overseas Trade, had expressed his personal interest in the new organisation, and the company was appreciative of the assistance that had already been received from the Department.

Mr. H. P. Potts, Vice-Chairman, said that the considerations which had led to the formation of the company were a realisation of the need to be able to appoint good overseas agents, and an appreciation that a return to pre-war methods would not do for the future. In the organisation that had been set up, it was believed that an instrument had been provided to secure the right selection of overseas agents, and to support and supervise their efforts, as well as a medium which would provide for its members close contact with all overseas and Home Government Departments, with overseas buyers, with current legislation of all kinds affecting overseas business, and to conduct specialised market research required by the small tool and equipment industry. Information would be interchanged among members. Although British Engineers Small Tools & Equipment Co. Ltd. was a co-operative overseas selling organisation, it did not concern itself with the individual price structure of its member firms.

**NEW PASSENGER STATION AT PORTADOWN.**—It is reported from Northern Ireland that Portadown Urban Council recently approved plans submitted by the Great Northern Railway Company (Ireland) for the changing of the passenger station to Woodhouse Street, and the provision of a goods station near the Fair Green.



The covers of some of the more important home and overseas railway staff magazines

## Notes and News

**South African Railway Earnings.**—South African railway earnings from the period April 7 to May 5, totalled £4,002,165, compared with £3,454,856 in the corresponding period of 1944.

**Safe Driving Competition.**—Five London Transport Central Bus drivers have been awarded bronze crosses in the Safe Driving Competition for 1943 for 25 consecutive years of freedom from accident. Lord Ashfield presented the awards to the men at 55, Broadway.

**Leopoldina Railway Co. Ltd.**—Notice is given that the Leopoldina Railway Co. Ltd. will on July 2 pay to the holders of its 4 per cent. debenture stock on the register on May 26, 1945, interest at 4 per cent. (actual) less income tax, in respect of the half-years ended June 30 and December 31, 1943.

**L.N.E.R. Debenture Interest Warrants.**—For the purpose of preparing the warrants for interest on the company's 3 per cent. and 4 per cent. debenture stocks, and 4½ per cent. sinking fund debenture stock for the half-year ending June 30, 1945, balances will be struck as at the close of business on June 11. See our Official Notices on page 555.

**Stewarts and Lloyds Limited.**—Speaking at the recent ordinary general meeting of Stewarts and Lloyds Limited, held recently in Glasgow, Sir Allan Macdiarmid, the Chairman, said he would like to say a word on government controls. There was no doubt in his mind that control must continue, at any rate to some extent for some time. So long as we were at war and so long as commodities and necessities were in short supply, some form of control and rationing was necessary.

**U.S.A. Exports and Imports.**—The U.S. Bureau of Census reports that the recent marked decline in U.S. exports was halted abruptly in March, when the total increased to \$1,029,000,000, or 17 per cent. more than in February. This increase resulted principally from a 36 per cent. increase in non lend-lease or commercial exports; lend-lease exports increased by only 9 per cent. General imports, with a value of \$371,000,000, during March, exceeded those of February by 14 per cent. and showed the greatest value since May, 1944.

**Uruguayan Railways.**—According to a Reuter message from Montevideo, the Uruguayan Minister of Public Works, Sr. Berreta, has been placed in charge of members of the commission appointed by the Government to study the position which has arisen as the result of the claim made by the Central Uruguay Railway for increased tariffs or other measures, as outlined in our issue of April 27, page 410. Sr. Eduardo Garcia Guniga was nominated President of the commission and Sr. Mario Lenzi, Director of the State Railways, was appointed Secretary.

**The Salvage of Paper.**—Designed and presented by the Waste Paper Recovery Association, the mobile exhibition housed in a specially-constructed trailer and entitled "Your paper goes to war," has visited over 100 factories and it has been seen by some 100,000 people. Recently the exhibition has been revised, to stress the fact that, even with victory in Europe achieved, paper salvage must continue, both for the successful prosecution of the war against Japan, and in order to meet home needs. Economy is needed not only to increase the

meagre wartime allowance of paper but also to assist in many industries vital to the country's future, including aircraft construction, radio, building, food, and medical supplies. Even when unlimited shipping space is once more available, supplies of paper-making materials will be scarce all over the world, and the deficiency must still be made up by paper salvaged at home.

**Forestal Land, Timber & Railways Co. Ltd.**—The profit of the Forestal Land, Timber & Railways Co. Ltd. for the year ended December 31, 1944, was £484,206 (£615,176). The final ordinary dividend was at the rate of 3 per cent. with a bonus of 3 per cent., making total for the year of 9 per cent. (same). The amount carried forward was £123,084 (£176,752).

**Panama National Railway Net Revenue.**—Data recently made available by the Contraloria General of the Republic of Panama show that income of the Chiriqui National Railway (Ferrocarril Nacional de Chiriqui) for the first six months of 1944 totalled \$192,519, compared with \$205,928 for the corresponding period of 1943; expenses decreased to \$186,147 in 1944 from \$193,470 in 1943.

**Mechanical Engineer Required.**—An important firm of engineers in the North of England requires a mechanical engineer aged 35 to 45, with high qualifications and considerable experience to fill a senior post on their general management staff. Applicants must also have experience of locomotive manufacture and design and a knowledge of diesel traction. For full particulars see our Official Notices on page 555.

**Leopoldina Railway Tariffs.**—The directors of the Leopoldina Railway Co. Ltd. announce that to meet increased working costs consequent upon new wage scales the Brazilian Government has authorised an increase of 25 per cent. in tariffs, with the exception of second class suburban fares, to come into force today, Friday, June 1. In addition there has been established a special new surcharge on tariffs of 10 per cent. earmarked for the renewal of existing installations and rolling stock.

**Oxford Transport Trust Limited.**—The British Electric Traction Co. Ltd. is largely interested in the Oxford Transport Trust Limited which, jointly with the Great Western Railway Company, controls the City of Oxford Motor Services Limited. Revenue of the Oxford Transport Trust for the year ended March 31, 1945, amounted to £19,549. After deducting expenses and income tax the profit was £9,423. Adding £16,238 brought forward makes a total of £25,661. Dividend for the year is 11 per cent., less tax, and the amount to be carried forward is £18,922.

**Financial Aspect of Railway Post-War Improvements.**—Mr. S. W. Fairweather, Vice-President of Research & Development, Canadian National Railways, in the course of an address at a recent meeting of the Association of American Railroads in New York, said that fundamentally the railways would meet the test of post-war traffic with a pre-war plant. Repairs, as such, would not be enough. The railway industry, if it were to meet the aggressive competition of other forms of transport, would need to spend vast sums on improvements. One would be unduly optimistic, however, if one did not note that the ability to carry out improvements depended on the credit structure, and that, in turn, depended on the solution of the railways' relationship to the rest of the community. Let them hope that the high level of national income in the post-war

period would give the railways a sufficient breathing spell to permit of an adjustment, and that intelligent consideration would be given to the fundamental necessity of having a sound network of railways on which the industrial development of the future might rest securely.

**Rhodesia Railways Limited.**—Approximate gross receipts of the Rhodesia Railways Limited for the month of March, 1945, were £493,322 and for the six months

## British and Irish Railway Stocks and Shares

Stocks	Highest 1944	Lowest 1944	Prices	
			May 29, 1945	Rise/ Fall
G.W.R. Cons. Ord. ...	62½	55	53½	- 1
5% Con. Pref. ...	122½	114½	119	- 1½
5% Red. Pref. (1950) ...	110	104	105	-
5% Cons. Charge ...	135½	128	135½	- 1
5% Cons. Guar. ...	134½	125	132½	- 1
4% Deb. ...	118½	112½	116½	- 1
4½% Deb. ...	124½	119½	123½	-
4½% Deb. ...	124½	119½	123½	-
5% Deb. ...	137	129½	136½	-
2½% Deb. ...	77	73½	77½	+ 1
L.M.S.R.				
Ord. ...	34½	27½	26½	-
4% Pref. (1923) ...	64	55½	53½	-
4% Pref. ...	81	72	75½	- 1½
5% Red. Pref. (1955) ...	105	102	105½	-
4% Guar. ...	107½	99½	103	-
4% Deb. ...	111½	104	109½	-
5% Red. Deb. (1952) ...	111	108	108½	-
L.N.E.R.				
5% Pref. Ord. ...	104	77½	68	-
Def. Ord. ...	57½	34	3½	+ ½
4% First Pref. ...	68½	55½	53½	-
4% Second Pref. ...	35	28½	27½	+ ½
4% Red. Pref. (1955) ...	102	97½	102	-
4% First Guar. ...	105	96	101½	-
4% Second Guar. ...	95	88	95½	-
3% Deb. ...	88	80	87½	-
5% Deb. ...	110	103½	109	-
5% Red. Deb. (1947) ...	105½	101½	101½	-
4½% Sinking Fund Red. Deb. ...	107	104½	105½	-
SOUTHERN				
Pref. Ord. ...	80½	71½	72	- 1
Def. Ord. ...	26½	23	23	- ½
5% Pref. ...	122	113½	118½	- 2
5% Red. Pref. (1964) ...	117½	112½	115½	-
5% Guar. Pref. ...	134	125½	132½	- 1
Red. Guar. Pref. (1957) ...	115½	112½	115½	-
4% Deb. ...	118	110	115½	-
5% Deb. ...	135½	127	135	-
4% Red. Deb. (1962- 67) ...	111½	107½	110½	-
4% Red. Deb. (1970- 80) ...	112	108½	112½	-
FORTH BRIDGE				
4% Deb. ...	107	103	105	-
4% Guar. ...	106½	102	105	-
L.P.T.B.				
4½% "A" ...	125	119	123½	-
5% "A" ...	133½	128	133½	-
3% Guar. (1967-72) ...	99	98	99	-
5% "B" ...	124½	118½	123½	-
"C" ...	72½	64½	67½	-
MERSEY				
Ord. ...	35½	33	36½	-
3% Perp. Pref. ...	72	66	71	-
4% Perp. Deb. ...	105	103	106	-
3% Perp. Deb. ...	85½	79½	84	-
IRELAND*				
BELFAST & C.D.				
Ord. ...	9	6	6½	-
G. NORTHERN				
Ord. ...	33½	19	26	- 1
Def. ...	49	37	44½	- 1½
Guar. ...	70	57½	69½	- 1½
Deb. ...	90½	81½	88	- 2½
IRISH TRANSPORT				
Common ...	—	—	70½	- 1
3% Deb. ...	—	—	99½	-

\* Latest available quotation

## OFFICIAL NOTICES

## London and North Eastern Railway Company

NOTICE is hereby given that, for the purpose of preparing the Warrants for Interest on the Company's 3 per cent. and 4 per cent. Debenture Stocks and 4½ per cent. Sinking Fund Debenture Stock for the half-year ending 30th June, 1945, the balances will be struck as at the close of business on 11th June, and Interest will be payable only to those Stockholders whose names are registered on that date. Transfers of the above-mentioned Stocks should, therefore, be lodged with the Registrar of the Company at Hamilton Buildings, Liverpool Street Station, London, E.C.2, before 5 p.m. on the 11th June.

By Order,

W. H. JOHNSON,  
Secretary of the Company.

Marylebone Station,  
London, N.W.1.  
1st June, 1945.

**A**N important firm of engineers in the North of England wish to appoint a Mechanical Engineer, aged 35 to 45, with high qualifications and considerable experience to fill a senior post on their general management staff, carrying progressive responsibility.

Applicants should possess a good general education and technical education leading to a degree or equivalent qualification; considerable workshop experience and knowledge of production methods; experience of Locomotive Manufacture and design, with the addition of running experience; knowledge of Diesel traction and some commercial experience an advantage. Salary and emoluments from £1,250 p.a. upwards.

Write quoting C.2386KA, to Ministry of Labour and National Service, Central (T. and S.) Register, Room 5/17, Sardinia Street, Kingsway, London, W.C.2, for application form, which must be returned completed by 13th June, 1945.

ended March 31, 1945, £3,020,127 as compared with £512,879 and £3,208,293 respectively for the corresponding periods in the previous year. The number of miles open was 2,445.

**Buenos Aires Transport Corporation.**—The Argentine Government has, according to Reuter, decreed the transfer of the shares of the Transport Corporation of Buenos Aires to a nominal value of 61,599,243 pesos. This step brings the Corporation nearer to nationalisation.

**Beira Railway Co. Ltd.**—For the month of March, 1945, the approximate gross receipts of the Beira Railway Co. Ltd. were £77,141 and for the six months ended March 31, 1945, were £463,719, as compared with £79,500 and £465,830 for the corresponding periods in the previous year. The number of miles open was 204.

**U.S. Railway Freight Rates.**—According to *The Financial Times* the Interstate Commerce Commission has ordered increases by the eastern lines of the U.S.A. and reductions by the southern and western lines. This is part of a long-range programme of the Commission to give the south and west greater equality with the east in the matter of freight rates.

**Railway & Canal Commission.**—An Order entitled the Railway & Canal Commission Fees Order, 1945, which came into operation on May 2, is signed by the three *ex-officio* Commissioners, namely, Mr. Justice Wrottesley, for England, Lord Carmont, for Scotland, and Lord Chief Justice Andrews, for Northern Ireland; and by the two Appointed Commissioners, Sir Francis Kyffin Taylor and Sir Francis Dunnell, both of whom were appointed in 1930.

**Eastern Bengal Railway Annuities.**—In accordance with the provisions of Act 47 & 48 Vict. c. 204 (Eastern Bengal Railway Company Purchase Act, 1884), it is notified that on March 31, 1945, a total sum of £1,066,835 was invested for the purpose of providing a sinking fund in respect of the Annuities Class "B." The purchase was effected on July 1, 1884, by means of an Annuity of £139,162, which is now represented by £41,914 of Annuities Class "A," £74,936 of Annuities Class "B," and £541,054 of India 3½ per cent. stock. Both classes of annuity will terminate on July 30, 1957.

**Johnson & Phillips Limited.**—Speaking at the recent annual general meeting of Johnson & Phillips Limited, Mr. G. Leslie Wates, J.P., the Chairman & Managing Director, said it was obvious that controls would have to remain for some time until shortages of essential raw materials were made up and life sufficiently returned to normal to enable freedom in various directions to be recovered without dangerous

repercussions on prices, but the sooner these controls went the better for British industry. If control was exercised in the true interest of the producer and the consumer, with judicial balancing of such interests, it would save very much distress and industrial conflict.

**Right-Hand Rule of the Road in Uruguay.**—On January 4, the Department of Montevideo, Uruguay, established July 1 of the present year as the effective date for the change-over from left-hand to right-hand driving of road motor vehicles. It is understood that, when similar action has been taken by the remaining 18 Departments, the Federal Government contemplates the issue of a Decree providing for the change-over throughout the entire Republic.

**Metropolitan-Vickers Electrical Co. Ltd.**—The Lancaster aircraft "Aries" built by the Metropolitan-Vickers Electrical Co. Ltd., flew round the world last autumn while on a navigational mission to the Pacific, and toured the United States, Canada, and South Africa. On their return to this country some members of the crew visited the Metropolitan-Vickers factory at Trafford Park just before the naming on December 21, 1944, of the 1,000th bomber produced there. Recently "Aries" has made another expedition to gather navigational data, this time over the North Pole.

**McNamara & Co. Ltd.**—It is announced by McNamara & Co. Ltd. that for the year 1944 a No. 1 interim dividend has been declared at the rate of 4½ per cent., less income tax. It is stated that although final agreement has not yet been received from the Ministry of War Transport with regard to the accounts for 1943, the profits for that year will be approximately £35,000. In view of the unavoidable delay in obtaining certified accounts, a No. 2 interim dividend has been declared for 1944 at the rate of 4½ per cent., less income tax, making 8½ per cent. for the year. These dividends are payable to stockholders registered as on May 31, 1945.

**L.P.T.B. Extension of Time Application.**—The London Passenger Transport Board is applying to the Minister of War Transport for an Order under the Special Enactments (Extension of Time) Act, 1940, extending by three years (a) the provisions of Section 6 of the London Passenger Transport Act, 1937, as extended by Section 54 of the L.P.T.B. Act, 1939; (b) the time now limited by Section 34 of the L.P.T.B. Act, 1938, and the L.P.T.B. (Extension of Time) Order, 1942, for the carrying out of works authorised by the Acts of 1935, 1936, 1937 and 1939, for the provision, maintenance and equipment of trolley vehicle routes authorised by the Act of

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1937, and for the acquisition of lands authorised by the Acts of 1936 and 1939. The works in respect of which the application is made number altogether 30.

**Stoke-on-Trent L.M.S.R. Staff's Social Evening.**—A very successful social evening was held in the L.M.S.R. Sports Club at Stoke-on-Trent on May 25, in celebration of the cessation of hostilities in Europe. Mr. G. H. Nutter, District Goods & Passenger Manager, Stoke, presided, and was supported by Mr. G. H. Buckley, District Operating Manager, Stoke; Mr. N. L. Wallis, District Engineer, Stoke; Mr. J. R. Darbyshire, representing the Divisional Superintendent of Operation, Crewe; Mr. L. A. Taylor, District Estate Agent, Crewe; and the principal Goods Agents. The function was attended by over 100 members of the staff. The Sutherland Dance Band was in attendance and the catering arrangements were carried out by Mrs. Cornes, Manageress of the L.M.S.R. Canteen at Stoke. Mr. F. W. Coomer was the M.C.

## Contracts and Tenders

Five hundred box wagons have been ordered by the Canadian National Railways from the Eastern Car Co. Ltd. These cars, of 50-ton capacity, are for delivery this year.

The Crown Agents for the Colonies have placed orders with the North British Locomotive Co. Ltd. for a locomotive boiler and accessories for the British Guiana Railway; with the Vulcan Foundry Limited for locomotive boiler accessories for the Gold Coast Railway; with the Vulcan Foundry Limited, and with Robert Stephenson & Hawthornes Limited for locomotive boiler accessories for the Mauritius Government Railway.

Below is a list of orders placed recently by the Egyptian State Railways:—

Stewarts and Lloyds Limited: Steel tubes.  
Oliver Machinery Co. Ltd.: Machine parts and spares.

T. & W. Farmilo Limited: Cisterns.  
Tilley Lamp Company: Lighting material.  
Birmingham Battery & Metal Co. Ltd.: Copper tubes.

J. Stone & Co. Ltd.: Spares for air conditioning.  
A. G. Wild & Co. Ltd.: Black canvas.  
Concordia Electric Wire Co. Ltd.: Resistance wire.

George Spencer Moulton & Co. Ltd.: Rubber hose oil feed pipes.  
Skinningrove Iron Co. Ltd.: Nails.

N. Greening & Sons Ltd.: Woven wire.  
J. Stone & Co. Ltd.: White metal.  
Brown Bros. Co. Ltd.: Brass channels.

Eyre Smelting Co. Ltd.: Anti-friction metal.  
British Insulated Cables Limited: Aluminium bars.

Birmingham Battery & Metal Co. Ltd.: Copper sheets.

## Railway Stock Market

Unsettled by the forthcoming General Election, Stock Markets showed further weakness before steadier conditions prevailed. Dealers widened and marked down prices as a precautionary measure, but although the lower levels attracted very little demand, a more confident tendency developed in the absence of any substantial volume of selling. British Funds firmed up on the belief that the cheap money policy will be continued whatever the result of the General Election. Industrials became steadier following their recent reaction, including colliery, electric supply and other shares particularly susceptible to current political uncertainties.

Moreover, home railway prior charges firmed up, and after earlier weakness, junior stocks rallied and regained part of the declines recorded towards the end of last week. Yield considerations prompted a little buying of junior stocks. It is hoped that, particularly as the interim dividends are due in July, there are reasonable prospects of prices responding satisfactorily if markets develop strength next month following the result of the General Election. At current levels, Great Western yields nearly 8% per cent., Southern deferred 8½ per cent., L.M.S.R. 9½ per cent., and L.N.E.R. second preference 10½ per cent. Moreover, the yields of over 7½ per cent. on L.M.S.R. 1923 preference and L.N.E.R. first preference induced a little buying of these stocks, and Southern preferred also showed some recovery; but prices generally have regained only part of the declines made a week ago. Among debentures, Great Western 4 per cents. return nearly 3½ per

cent., Southern debentures slightly more than this, and L.M.S.R. 4 per cent. yield not far short of 3½ per cent. These are, of course, quite attractive yields, bearing in mind the high-class investment merits of these prior charges. The junior stocks have been valued on a high yield basis throughout the war because of uncertainty as to the future organisation and control of transport after the existing fixed rental agreement terminates. It now seems reasonable to suppose that Government policy in this connection will be defined later in the year, particularly as the main issue of the election is that of private ownership *versus* nationalisation.

Meanwhile, it continues to be assumed that the fixed rental agreement is likely to operate for another two years, which implies the maintenance of dividends at around 1944 levels. It cannot, of course, be assumed that after the end of the wartime agreement, dividends will necessarily continue to be maintained, and until more is known of the shape of things to come, it is only reasonable for home rail junior stocks to be classed as carrying speculative risk. Nevertheless, there still seems no logical reason for yields being materially higher than those ruling on colliery shares and those of other companies in industries whose outlook will turn considerably on Government policy. Although the dividend position for junior stocks after the end of the fixed rental may be uncertain, there is every reason to expect that in any case full dividends will continue on L.M.S.R. senior and 1923 preference and also on L.N.E.R. first preference and Southern preferred, all of

which have rallied well from the lowest levels recorded last week.

After declining to 51½, Great Western ordinary rallied to 53½, which, however, compares with 54½ a week ago. Great Western 5 per cent. preference was 118½, against 120½ a week ago, the guaranteed stock 132, against 133, and the 4 per cent. debentures 116½, against 117. L.M.S.R. recovered to 26½, after being no better than 25½, but a week ago was 27½; the 1923 preference declined to 52½, later showing a recovery to 53½, and the senior preference was 75½, following 74½. L.N.E.R. second preference rallied to 27½, after 26½, and the first preference was 53½ (after a decline to 52½). Southern deferred rallied to 22½, but touched 22½ towards the end of last week when the preferred ordinary declined to 70, or 1½ below the current level. London Transport "C" at 67½ virtually regained an earlier decline.

Argentine rails moved back further, but later rallied, reflecting the surrounding market trend. Buenos Ayres Great Southern ordinary was 10½, compared with 11 a week ago, the 5 per cent. preference 24½, against 26½ and the 4 per cent. debentures 62½, compared with 62½. Buenos Ayres Western was supported and put on ½ to 10½, the 4½ per cent. preference also rallied to 25½ and the 4 per cent. debentures to 55½. Assam Railways & Trading "A" stock recorded a big rise of 35½ to 195½ on the capital re-organisation and repayment plans which have followed the sale of the railway to the Indian Government. Elsewhere, Leopoldina stocks responded to the increase in tariffs; the 4 per cent. debentures improved to 53½. Canadian Pacifics strengthened to 16½.

### Traffic Table and Stock Prices of Overseas and Foreign Railways

Railways	Miles open	Week ended	Traffic for week			No. of Weeks	Aggregate traffics to date			Shares or Stock	Prices					
			Totals		Inc. or dec. compared with 1943/4		Totals		Increase or decrease		Highest 1944	Lowest 1944	May 22, 1945	Yield % (See Note)		
			1944/5	1943/4			1944/5	1943/4								
South & Central America																
Antofagasta (Chili) & Bolivia	834	20.5.45	£31,160	+	4,430	20	£602,390	558,690	+	43,700	Ord. Stk.	13½	9½	10½	Nill	
Argentine North Eastern	753	19.5.45	18,250	+	856	46	852,275	711,562	+	140,713	6 p.c. Deb.	6½	4½	9½	Nill	
Bolivar	...	174	Apr., 1945	4,897	-	209	16	20,965	21,059	-	94	Bonds	18½	7½	8½	Nill
Brazil	...	...	...	...	...	...	...	...	...	...	Ord. Stk.	7½	3½	5½	Nill	
Buenos Ayres & Pacific	2,773	19.5.45	137,500	+	6,250	46	6,326,500	5,271,625	+	1,054,875	Ord. Stk.	14½	9½	10½	Nill	
Buenos Ayres Great Southern	5,080	19.5.45	200,875	+	39,000	46	9,648,250	8,629,562	+	1,018,688	Ord. Stk.	13½	9½	10½	Nill	
Buenos Ayres Western	1,924	19.5.45	82,687	+	17,687	46	3,255,562	2,750,187	+	505,375	"	10½	6½	7½	Nill	
Central Argentine	3,700	19.5.45	178,190	+	10,734	46	8,309,122	7,449,656	+	859,466	Dfd.	4½	3	4½	Nill	
Do.	...	...	...	...	...	...	...	...	...	...	Ord. Stk.	5½	4	5½	Nill	
Cent. Uruguay of M. Video	972	19.5.45	40,474	+	6,519	46	1,560,458	1,555,496	+	4,962	Stk.	17½	14½	16	Nill	
Costa Rica	...	262	Apr., 1945	28,642	+	3,253	33	231,946	225,154	+	6,792	I Mt. Deb.	101	101	102½	£5 17/1
Dorada	...	70	Apr., 1945	30,890	+	6,832	17	113,595	97,339	+	16,256	Ord. Stk.	6½	4½	5½	Nill
Entre Rios	...	808	19.5.45	26,487	+	6,156	46	1,143,519	952,745	+	190,775	Ord. Sh.	38/-	23/3	27/6	Nill
Great Western of Brazil	1,030	19.5.45	22,400	+	6,100	20	523,200	452,600	+	70,600	Ord. Sh.	...	...	...	...	
International of Cl. Amer.	794	Apr., 1945	£238,269	+	£92,127	17	£816,062	£815,502	+	£99,440	1st Pref.	1½	½	1	Nill	
Interoceanic of Mexico	...	...	...	...	...	...	...	...	...	...	5 p.c. Deb.	88	79	78½	£6 7/5	
La Guaira & Caracas	224	Apr., 1945	6,506	-	984	16	22,416	29,446	-	7,030	Ord. Stk.	5½	4	5½	Nill	
Leopoldina	...	1,918	19.5.45	50,793	+	8,135	20	902,890	913,882	+	10,992	Ord. Stk.	5½	4½	4	Nill
Mexican	...	483	21.5.45	656,700	+	ps. 244,400	21	ps. 12,113,700	ps. 8,414,600	+	ps. 3,699,100	Ord. Stk.	4	2	2	Nill
Midland Uruguay	...	319	Mar., 1945	16,993	+	1,573	38	155,974	155,768	+	206	Ord. Sh.	75/10	65/10	70/10	£3 11/5
Nitrato	...	382	15.5.45	9,343	+	3,918	19	68,100	75,540	+	7,440	Fr. Li. Stk.	78	68	78½	£7 12/10
Paraguay Central	...	274	18.5.45	£64,930	+	£27,602	46	£2,785,995	£2,400,779	+	£385,216	Ord. Sh.	9	10	9	Nil
Peruvian Corporation	1,059	Apr., 1945	126,043	+	4,934	43	1,296,522	1,085,795	+	210,727	Ord. Sh.	21/3	13/9	12/6	Nil	
Salvador	...	100	Mar., 1945	c 202,000	+	c 28,000	38	c 1,159,000	c 1,158,000	+	c 1,000	Ord. Stk.	4	2½	2½	Nil
San Paulo	...	153½	...	...	...	...	...	...	...	...	Ord. Stk.	57½	46	53½	£3 14/9	
Tatral	...	156	Apr., 1945	2,910	-	1,735	42	26,280	54,660	-	28,380	Ord. Sh.	21/3	13/9	12/6	Nil
United of Havana	1,301	19.5.45	48,738	-	9,195	46	2,505,554	2,700,661	-	195,107	Ord. Stk.	4	2½	2½	Nil	
Uruguay Northern	73	Mar., 1945	1,856	+	106	38	14,313	13,265	+	1,048	Ord. Stk.	—	—	—	—	
Canada											Ord. Stk.	17½	13½	16½	£6 4/10	
Canadian Pacific	...	17,028	21.5.45	£1,217,000	-	4,200	19	£23,537,400	£23,725,200	-	187,800	Ord. Stk.	—	—	—	9.30
India											Ord. Stk.	129½	97½	129½	£3 9/6	
Barbi Light	...	202	Apr., 1945	31,072	+	2,640	4	31,072	28,432	+	2,640	Ord. Stk.	—	—	—	—
Various											Prf. Sh.	7½	5½	6½	Nil	
Egyptian Delta	...	607	20.4.45	17,939	-	1,043	3	36,015	39,129	-	3,114	B. Deb.	63½	58	59	Nil
Manila	...	—	Mar., 1945	17,935	-	7,095	39	173,275	270,532	-	97,257	Inc. Deb.	101½	99½	96½	£42/11
Midland of W. Australia	277	24.2.45	386,036	+	10,636	17	—	—	—	—	—	—	—	—	—	
Nigeria	...	1,900	21.4.45	985,666	+	122,591	3	2,988,481	2,536,564	+	451,917	—	—	—	—	
South Africa	...	13,301	Jan., 1945	1,279,871	+	18,572	31	—	—	—	—	—	—	—	—	
Victoria	...	4,774	—	—	—	—	—	—	—	—	—	—	—	—	—	

Note. Yields are based on the approximate current price and are within a fraction of ½. Argentine traffics are given in sterling calculated @ 16 pesos to the £

† Receipts are calculated @ 1s. 6d. to the rupee